RADIO COMMUNICATION

March 19

NEC PREVIEW
see centre pages

GOLDEN JUBILEE
COMMONWEALTH CONTEST
14-15 March 198

of the Radio Soc[illegible] of Great Britain

RSGB

AUTHORISED YAESU

YAESU

AUTHORISED YAESU

100w all mode, All band QSK Transceiver — the super new addition to the YAESU range.

the FT 767 GX! Multimode —

Top Band — 70cms*, Multimode

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- Front panel keypad frequency entry
- Antomatic SWR & Watt meter (digital)
- 10 multi-function memories
- Auto Tracking, Scanning
- General Coverage Receiver
- Built-in Power Supply
- Built-in auto HF antenna tuner
- Four internal CPU's
- Twin VFO's
- SSB/CW/FSK/AM/FM
- Plug-in modules for 2m, 6m and 70cms
- Improved built-in keyer

YAESU		
FT 757GX	HF transceiver gen coverage all modes	949.00
FC-757AT	Automatic antenna tuner	349.00
FP-757GX	Switched mode PSU - 50% duty	100.00
FP-757HD	Heavy duty PSU - 100% duty	239.00
FT-23	Miniature 2 metre handie	249.00
FT-73	Miniature 70 cms handie	259.00
FRG-8600	Gen coverage Rx. 150 kHz-30 MHz. AM CW SSB NBFM	625.00
FRV-8800	Converter 118-174 MHz	100.00
NTSC	Video unit for FRG 9600	12.00

YAESU		
FT-726R	Multimode transreiver 2m fitted	989.00
21/22/26	HF module	269.00
50/726	6m module	249.00
430/726	70cm module	349.00
SAT-726	Duplex module	130.00
XF-455MC	300Hz CW Filter (Ceramic)	54.00
FT-290R	2m Portable/mobile/base/ multimode "MKII"	425.00
MMB-11	Mobile mount	37.50
NC11C	Charger	10.50
FT-980	HF transceiver with gen coverage RX (CAT system)	1650.00
SP-960	External speaker with audio filter	75.00

YAESU		
CSC-1A	Case	6.50
YM-49	Spkr mic	19.00
MH-12A2B	Spkr mic	20.00
FVS-1	Voice synthesiser module	27.50
FT-270R	2m FM transceiver 25W. Scanning mems. Dual VFO	349.00
FT-270	2m FM transceiver 45W. Scanning mems. Dual VFO	399.00
FVS-1	Voice synthesiser 270R/270RH	27.50
FT 727 R	— Duel Band Handie	P.O.A.
FL 7000	SOLID - STATE QSK LINEAR	P.O.A.

WE ALSO STOCK: DAIWA

PC1	Gen. Cov Con.	137.40
FL3	Audio filter for receivers	129.00
ASP/A	r.f. speech clipper for Yaesu	82.80
D75	Manual RF speech clipper	56.35
D70	Morse Tutor	56.35
MK	Keyboard morse sender	137.40
RFA	RF switched pre-amp	33.90
AD270-MPU	Active dipole with mains psu	51.75
AD370-MPU	Active dipole with mains psu	69.00
DC144/28	2m converter	39.67
ANF	Automatic notch filter	67.85
SR82	Auto Woodpecker blanker	85.25

+ B.N.O.S. ELECTRONICS

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ATU's		
HC-200	HF bands ATU 200W PEP	109.00
HC-400L	HF bands ATU 350W PEP	199.00
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HL-30V	30W 2m linear 0.5-3W input	54.00
HL-35V	VHF linear 0.5-5W (3W in 30W out)	76.00
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HL-160V	160W 2m linear 10W input	249.00
LINEAR UHF		
HL-20U	20W 70cm linear	82.90
HL-60U	60W 70cm linear 10W input	215.00
PREAMPS		
HRA-2	2m mast head pre-amp	100.00
HRA-7	70cm mast head pre-amp	100.00

HI-MOUND KEYS

HI-MOUND MORSE KEYS		
HK702	Up down keyer marble base	30.95
HK703	Up down keyer	29.35
HK704	Up down keyer	19.95
HK705	Up down keyer	15.49
HK706	Up down keyer	16.96
HK708	Up down keyer	14.95
HK802	Up down solid brass	86.31
HK803	Up down brass	82.64
HK808	Up down keyer	39.95
MK704	Twin paddle keyer	13.50
MK705	Twin paddle keyer marble base	25.65

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CONTENTS

EDITOR-IN-CHIEF
A W Hutchinson

Editorial assistant
N Jackson

Draughtsman
D E Cole

Editorial secretary
Mrs D R Moye

All contributions and correspondence concerning the content of *Radio Communication* should be addressed to:

The Editor
Radio Communication
Lambda House
Cranborne Road
Potters Bar
Herts EN6 3JE

Correspondence concerning the distribution of the journal, and all other Society matters should be addressed to:

RSGB Headquarters,
Lambda House,
Cranborne Road,
Potters Bar,
Herts EN6 3JE

Tel 0707 59015

Business hours: 1000 to 1600

Headline News
Tel 0707 59312 for a recording of the latest amateur radio news

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FRONT COVER

Commonwealth Contest trophies

The golden jubilee contest takes place this month

Technical articles on subjects of amateur interest are always welcome and should be sent to: The Editor, *Radio Communication*, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE.

All articles received are reviewed for technical merit by the RSGB Technical & Publications Committee, or an acknowledged expert on the subject, before acceptance. Payment at high competitive rates will be made for all articles published.

A contribution will only be considered for publication on the understanding that the person submitting it is the original author and owner of the whole copyright, and that on acceptance for publication such copyright will become the property of the RSGB in consideration of the above-mentioned payment by the RSGB to the contributor.

The editor will be pleased to send intending authors a manuscript preparation guide and to give any other advice and assistance requested.

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from TRIO, (and KENWOOD in the future) a **new** handheld transceiver, the **TH205E.**

The TH205 is a new 2 metre FM handheld transceiver from TRIO. It is supplied complete with a helical aerial, PB2 nicad (8.4V, 500mAh) and charger. Slotting into the range between the TH21E and the TH215E, the rig is designed and built to the usual TRIO high standard. A rugged diecast metal case adds to the strength of the handheld. For greater flexibility the TH205E operates on DC voltages from 7.2 to 16 volts. An external power supply connection is included on the rig's top panel (use optional power cable PG2V or PG3C). Output power is dependant on voltage. Switched to its high power setting, the TH205E produces 2.5 watts at 8.4 volts. This increases to 5 watts when supply is 13.8 volts. On its low power setting the output is reduced to 500 milliwatts.

The TRIO TH205E combines the simplicity of the TH21E with the additional convenience of band scan, three memories and a liquid crystal frequency display. In addition to frequency the memory channels remember whether the selected channel is in simplex or repeater shift mode. Information is quickly entered into any of the three memories which in turn are selected by the push of a front panel button. Another push of the same memory button restores the previous frequency. QSYing from a memory channel is also simple. Up and down buttons located alongside the digital display shift the frequency in 5 kHz steps. A single push of the button results in a 5 kHz step, continued press and frequency stepping is increased, both up and down buttons pressed together (the required direction button pressed first) and the shift is even more rapid. In band scan the same 5 kHz steps are used, the transceiver halting on an occupied frequency so that nothing is missed.

The TH205E has both an auto and operator set squelch, full repeater facilities including reverse repeater, a battery saver function whilst on receive and for operating in the dark, the frequency display can be illuminated. A comprehensive range of optional NICAD packs are also available. These are the PB1 (12V, 800mAh), PB3 (7.2V, 800mAh) and the PB4 (7.2V, 1600mAh). Other optional accessories include a rapid charger (BC7T), a compact charger (BC8T), dry battery case (BT5), soft cases (SC12 and SC13), belt hook (BH4), swivel mount (BH5), mobile mount (MB4), DC cable (PG2V) and for mobile operation a DC filtered cigar lighter power cable (PG3C).

TH205E..... £218.00 inc VAT. carriage £7.00

from TRIO, (and KENWOOD in the future) a **new** short wave receiver, the **R5000.**

The R5000 is a new general coverage receiver. It offers the dedicated short wave listener and radio amateur a receiver that will match the performance of the best transceivers available today.

The R5000's frequency range is continuous from 100 kHz to 30 MHz and its modes of operation are USB, LSB, CW, AM, FM and FSK. An optional VHF converter (VC20) extends the frequency range to include 108 to 174 MHz.

The R5000 uses 2SK 125 junction-type FETs in the high sensitivity direct balanced first mixer resulting in outstanding two signal characteristics and a substantially improved noise floor level.

Operating from either 12 V DC and 240 V AC the receiver can be used both in the home or whilst out in car, caravan or boat.

The receiver has two rates of tuning for each mode selected by a front panel switch. The frequency increments for SSB/CW/FSK are 10 Hz and 100 Hz, for AM 100 Hz and 1kHz and for FM 2.5 kHz and 5 kHz.

Both low (50 ohms) and high (500 ohms) aerial connections are provided on the rear panel of the R5000. The required aerial can be selected by means of a front panel switch. Information on which aerial to be used with a stored frequency can also be held in memory.

The R5000 has 100 memory channels which store frequency, mode and which of the two aerial connections has been selected. Information is easily transferred from one VFO to the other, from memory to VFO and in order to quickly access your favourite station, from VFO to any of the memories. Both memory scan and frequency scan (between frequencies in memories 8 and 9) are included in the receiver. Halt on an occupied channel whilst scanning can either be timed or until the signal drops. The entire one hundred memories can also be quickly scrolled to check the data held and to find the location of an empty channel.

To enhance reception, IF shift and a tunable notch filter are part of the R5000 receiver. Filter selection according to mode is automatic when the front panel selectivity switch is set to AUTO. This automatic selection can, of course, be overriden. Additionally the introduction of optional SSB and CW filters (YK88SN for SSB and either YK88C or YK88CN for CW) will improve the already excellent signal to noise ratio and selectivity. The optional YK88A-1 AM filter will improve the shape factor and enhance reception even further.

The R5000 general coverage receiver also has keyboard frequency entry, dual mode noise blanker, two 24 hour clocks with timer, option VSI voice synthesizer and CW tone mode indication for the blind operator, a large 100 mm diameter top mounted speaker, switchable AGC (fast or slow), RF attenuation (10, 20 or 30 dB steps) and a FLOCK switch which protects against frequency shift if the VFO knob is accidentally moved.

R5000..... £895.00 inc VAT. Carriage £7.00

All prices subject to confirmation

LOWE ELECTRONICS LTD.

Chesterfield Road, Matlock, Derbyshire DE4 5LE
Telephone 0629 2617, 2430, 4057, 4995.

send £1 for complete mail order catalogue.

station accessories

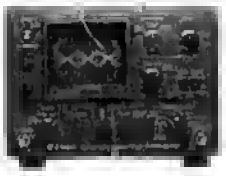
TL922 HF amateur band linear amplifier

The TL922 is a class AB2 grounded grid linear amplifier using two high performance EIMAC 3-500Z tubes. It covers 160 to 10 metres for SSB, CW and RTTY modes of operation. Engineering perfection, those who have seen a TL922 will know what I mean. It is one of the few items of amateur radio equipment which is truly hand built by a specialist engineer.

TL922 inc tubes . . . **£1495.00** inc VAT, carriage £7.00

SM220 station monitor

Based on a wide frequency range oscilloscope, the SM220 station monitor features in combination with a built-in two-tone generator, a wide variety of waveform observing capabilities. The SM220 aids efficient station operation as it monitors transmitted waveforms and it also serves as a sensitive wide frequency range oscilloscope for various adjustments and experiments. When fitted with the optional BS8 panoramic display and connected to one of the following transceivers (TS940, TS830, TS180, TS820 series) signal conditions in the vicinity of the receive frequency can be seen over a 40 or 200KHz range.

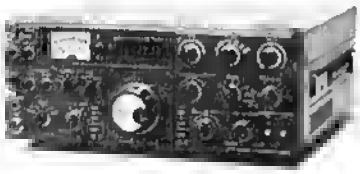


SM220 . . . **£362.00** inc VAT, carriage £7.00
BS8 . . . **£81.22** inc VAT, carriage £1.50

amateur band transceivers

TS830S HF amateur bands transceiver

Needing no description, the TRIO TS830S, which uses a pair of 6146B valves in the PA, is well known on the amateur bands (160 to 10 metres) for its superb signal quality. Modes of operation are USB, LSB and CW. Having variable bandwidth tuning, IF notch, IF shift and provision for various filters, its receive performance is excellent too.



TS830S . . . **£1095.00** inc VAT, carriage £7.00

TS530SP HF amateur bands transceiver

An HF amateur bands (160 to 10 metres) valve transceiver without frills but providing today's amateur with all the necessary facilities for reliable worldwide communications. Modes of operation are USB, LSB and CW.

TS530SP . . . **£895.00** inc VAT, carriage £7.00

send for the **TRIO** (and KENWOOD in the future) detailed leaflet

amateur band plus general coverage transceivers

TS940S HF transceiver with general coverage receiver.

Top of the range, the TS940S has every operating feature that the discerning HF operator needs. Amateur bands from 160 to 10 metres plus a general coverage receiver tuning from 150 kHz to 30 MHz. Modes of operation are USB, LSB, CS, AM, FSK and FM. Forty memory channels, each effectively a separate VFO and easy keyboard frequency entry make operation and ownership of the TRIO TS940S a pleasure.

TS940S . . . **£1995.00** inc VAT, carriage £7.00

TS930S HF transceiver with general coverage receiver

Much has been said and written about the ST930S and it now has a place high in the affection of radio amateurs. Modes of operation are USB, LSB, CW, AM and FSK. Providing full coverage of the amateur bands from 160 to 10 metres and including a general coverage receiver tuning from 150 kHz to 30 MHz, the TRIO TS930S is the ideal rig for today's crowded bands.

TS930S . . . **£1750.00** inc VAT, carriage £7.00

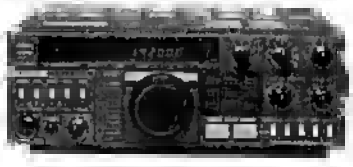
TS440S HF transceiver with general coverage receiver

A step forward in compact HF equipment, the TS440S covers the amateur bands from 160 to 10 metres and is also a general coverage receiver tuning from 100 kHz to 30 MHz. It has keyboard frequency entry, full and semi break-in on CW, one hundred memories and provision for fitting an internal ATU. Modes of operation are USB, LSB, AM, FM and AFSK.

TS440S . . . **£1195.00** inc VAT, carriage £7.00

TS430S HF transceiver with general coverage receiver

A compact HF transceiver suitable for mobile or portable operation, yet having all the facilities necessary for effective radio communication. The TS430S covers the amateur bands from 160 to 10 metres and is a general coverage receiver tuning from 100 kHz to 30 MHz. Modes of operation are USB, LSB, CW, AM with FM optional.



TS430S . . . **£995.00** inc VAT, carriage £7.00

All prices subject to confirmation

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send £1 for complete mail order catalogue.

AR2002 interface.

AR2002

RC PACK

Now available for the AR2002 is an RS232 interface (RC PACK) which consists of an 8 bit CPU with its own ROM and RAM.

Designed to be connected directly to the AR2002 or with an additional adapter to the AR 2001, the RC PACK gives two methods of controlling the receiver.

Using the internal software and with your own computer acting as a dumb terminal, the RC PACK provides 50 memory channels, 10 search bands, selectable up/down steps and adjustable delay times etc. You can also assign station descriptions to each listed memory.

If you wish to write your own programs using the RC PACK as an interface then "the sky's the limit".

For those who own a BBC computer we have designed an additional control system which is available in ROM.

The RS232 settings of the interface are 8 bit, no parity, 1 stop bit and either 2400, 4800 or 9600 baud (internally switchable).

AR2002.....£487.30 inc VAT carriage £7.00
RC Pack.....£255.63 inc VAT carriage £7.00
ARPROM (BBC).....£10.00 inc VAT carriage £1.00

DAIWA meters.

CN410M. . .3.5 to 150 MHz, forward 15/150 W, reflected 5/50 W, SO239 connectors. . .£61.72 inc vat, carriage £1.50.

CN460M. . .140 to 450 MHz, forward 15/150 W, reflected 5/50 W, SO239 connectors. . .£65.40 inc vat, carriage £1.50.

NS448 with remote head. . .900 to 1300 MHz, forward 5/60 W, reflected 1.6/6.6 W, N type connections. . .£86.60 inc vat, carriage £2.50.

NS660P with switchable meter reading (average, normal PEP and hold PEP) and provision for optional remote head (U66V), 1.8 to 150 MHz, forward 15/150/1500 W, SO239 connectors. . .£115.00 inc vat, carriage £2.50.

U66V remote head, 140/525 MHz, max 300 W, N type connectors. . .£55.27 inc vat, carriage £1.50.

SC20 extension cable for U66V, approx 20 metres long . . . £29.21 inc VAT, carriage £1.50.

data communications equipment.

CD600. . .RTTY, CW, ASCII, TOR, AMTOR decoder, output for UHF television, monitor and printer, can also be used as morse tutor. . .£215.14 inc vat, carriage £7.00.

CD670. . .A higher specification RTTY, CW, ASCII, TOR, AMTOR decoder complete with liquid crystal dot matrix display, variable RTTY shift, normal/reverse mode switch, outputs for TV, monitor and printer and can also be used as morse tutor. . .£286.73 inc vat, carriage £7.00.

CD660. . .Similar to the CD670 but without the built-in display. . .£264.97 inc vat, carriage £7.00.

advance information

KENWOOD

Following successful negotiations between Kenwood Corporation and Thorn-EMI, it has been decided to officially introduce the brand name "Kenwood" to the United Kingdom.

Special versions will continue to be produced for the different requirements of the United Kingdom but will be introduced with the name "Kenwood" in the future.

As the official distributor for Kenwood equipment in the U.K., we would emphasise that is is now more important than ever to purchase your equipment from an authorised dealer, to ensure that you receive the necessary technical and after-sales service which you have received in the past.

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The World's first 5 mode terminal unit!

Now, PACKET, AMTOR, RTTY, CW, ASCII transceive in one compact, intelligent terminal unit. Works with any computer equipped with an RS232 interface. Incorporates a no compromise HF Modem, with an 8 pole bandpass filter followed by a limiter/discriminator with auto threshold correction. The correct bandwidth is automatically chosen for the mode selected. A front panel switch allows selection between two transceivers. No more switching cables when moving from HF to VHF. All code conversion is taken care of by the internal Z-80A processor. Built-in tuning indicator. 12 volt D.C. power requirement. User friendly application programs/interface cables available for many popular personal computers.

ALL YOU WILL EVER NEED FOR AMATEUR DATA COMMUNICATION!

PK-232 ONLY **£269.95** inc VAT (£3.50 p&p)

NEW

PK-87

At last, a successor to the PK-80!
A brand new Packet Radio TNC from AEA

The Host mode of the new PK-87 can be utilized to improve terminal program operation.

Four new commands allow you to restrict the use of your station for both connects and as a digipeater. The Mailbox monitoring command allows monitoring without displaying the callsign headers, while standard monitoring includes both MFROM and MTO lists.

Software commands are used to select the terminal baud rate, the Packet baud rate (45-9600), and modem tones 1070/1270, 2025/2225, 1200/2200. Built in HF modem.

Hardware improvements also make the PK-87 stand above the rest. In addition to standard Data Carrier Detect, Push to Talk, Status, and Connect Indicators, the PK-87 has front panel LEDs for operation mode (Converse, Transparent, Command) and multiple connects. The PK-87 uses a Zilog 8530 SCC for hardware HDLC. The Modem disconnect of the PK-87 guarantees compatibility with high speed modems in the future.

A new generation of Packet terminal node controllers begin in 1987 with the new AEA PK-87.

PK-87 ONLY £172.50 inc VAT (£3.50 p&p)

FAX-1a PRINTER

New HF Fax Receiver price breakthrough!

UK designed and produced, you can now obtain weather maps, press photographs and satellite cloud cover detail on any Epson FX-80 compatible computer printer with amazing clarity. Do not confuse with other products offering only a low resolution screen display. They do not even come close to the FAX-1 in image clarity. Built-in tuning indicator. All standard R.P.M. and I.O.C. rates. Fully automatic operation (including START; RPM, IOC selection). 1:1 picture aspect ratio. 12v D.C. power requirement. Built-in tuning indicator. Built-in clock and timer. Battery powered compatible printer available for Marine, mobile applications. Needs only audio from an HF receiver and a suitable printer to operate. PRINT QUALITY COMPARABLE TO PROFESSIONAL UNITS AT ONE FIFTH THE PRICE!

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Terminal unit still available **£245.00** plus £2.50 p&p

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UHF MOBILE

YAESU FT 770RH 70cm 25w FM high visibility display	495.00
YAESU FT 790R 70cm all mode	399.00
YAESU FT 2700RH 70cm/2m 25w each band full duplex	399.00
ICOM IC 490E all mode 70cms 10w/1w	617.00
ICOM 3200E 2m/70cm 25w each band	556.00
ICOM IC 47E 25w FM very small 9 memories	495.00

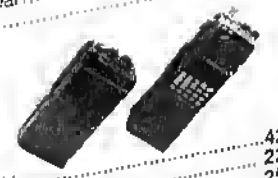
HF EQUIPMENT

YAESU FT 767 1.8MHz-430MHz. All mode gen cov rcvr	POA
YAESU FT ONE gen cov tvcr	POA
YAESU FT 980 gen cov lcvr inc AM/FM	1750.00
YAESU FT 757GX gen cov lcvr inc AM/FM/Keyer	949.00
ICOM IC 751A gen cov lcvr inc AM/FM/Keyer	1465.00
ICOM IC 745 gen cov lcvr	925.00
ICOM 735 gen cov tcvr inc AM/FM	929.00

HF LINEAR AMPLIFIERS

YAESU FL 2100Z 160m to 10m	899.00
YAESU FL 7000 solid state integral PSU and ATU	1590.00
TOKYO HL 1K 1Kw amplifier	POA
TOKYO HL 1KGX new 1K linear	POA
TOKYO HL 2K new 2K linear	POA
TOKYO HL 3K 3Kw new linear	POA
ICOM IC 2KL/LPS.	1646.00

HANDHELD TRANSCEIVERS



FT 727 VHF UHF Hand held	425.00
YAESU FT 203R with FBA 5 battery case	225.00
YAESU FT 203R with FNB 3 nicad 2.7w	255.00
YAESU FT 203R with FNB 4 nicad 3.7w out	259.00
YAESU FT 203R with FNB 4 nicad 3.7w case 1.8w	269.00
YAESU FT 209R with FBA 5 battery case 2.7w	299.00
YAESU FT 209R with FNB 3 nicad 2.7w	305.00
YAESU FT 209R with FNB 4 nicad 3.7w	275.00
YAESU FT 209R with FNB 4 nicad battery case	309.00
YAESU FT 209RH with FBA 5 battery case	315.00
YAESU FT 209TH with FNB 3 nicad 3.7w	225.00
YAESU FT 209RH with FNB 4 nicad 5w	289.00
ICOM IC 2E synthesised 1.5w 2m	275.00
ICOM IC 02E keypad entry lcd display	289.00
ICOM IC 4E synthesised 1.5w 70cm	
ICOM IC 04E keypad entry lcd display 70cms	

FT 703R and FT 709R available same output spec as FT 203/209.

RECEIVERS

YAESU FRG 8800 gen cov 150Khz-30Mhz large display, keyboard entry/free tuning	609.00
ICOM IC R71 100 Hz to 30Mhz passband tuning/notch filter, variable tuning rate	789.00
YAESU FRV 8800 converter module 118-179 for FRG 8800 range extension	100.00
AOR 2002 UHF/VHF 25Mhz-550Mhz and 800 Mhz-1300Mhz. STAR BUY.	465.00
YAESU FRG 9600 UHF/VHF. Scanning receiver all mode 100 mem. Now up to 950Mhz	499.00
ICOM R700 Scanning rcvr 25-2000 Mhz 99 memories all mode	919.00
FDK ATC 720 airband rcvr handheld 720 channels	189.00
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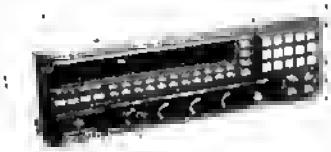

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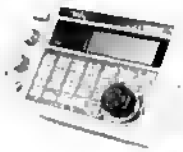

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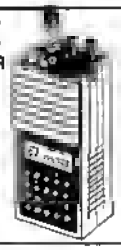

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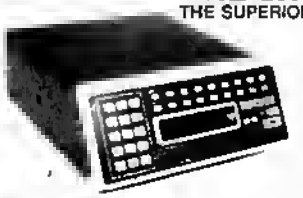

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£219 FREE DELIVERY
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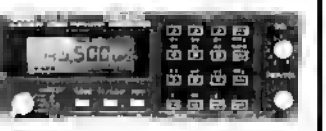

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20 WATTS

£399 FDK M750XX

If you are in the market for an all-mode rig, you cannot afford to ignore this offer. 20 watts of FM and SSB/CW 144-146MHz. Digital readout plus up-down mic control all help to make this a bargain. 12v DC operation makes it ideal for mobile or base use. Again 1970 prices, so hurry!

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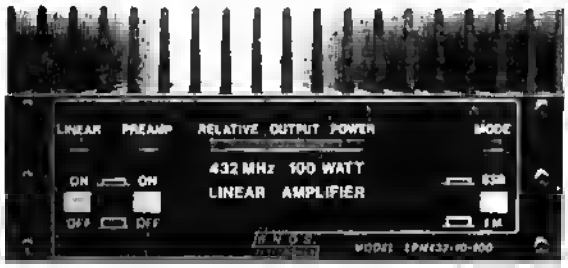

When you compare 70cm Linear Amplifiers, it's surprising just what isn't mentioned in the adverts. In looking at the three most popular makes of 70cm amplifier available in Britain, you have to look for the details specifications before you can truly evaluate performance. To make the information more simple to digest we've tabulated it. All of this information is taken from publications which are "in the public domain". There are two sets of tables, one comparing the low input/medium output models and one table for the 100 Watt output models (10W input versions).

Tokyo and Microwave Modules use PIN diode switching. These devices are notorious for the amount of noise they introduce when used on the receive path. They are also well known for their tendency to self-destruct when RF is applied with no DC power supply. This is one of the reasons why there is no "straight through" mode on amplifiers using PIN diodes. BNOS amplifiers use sequential switched relays throughout – which is why they **can be used straight through** and DO NOT introduce noise.

	BNOS	TOKYO	M MODULES
MODEL	LPM432 1 50	HL30U	MM432 30 L
OUTPUT POWER	50W	30W	30W
INPUT POWER	1W	2W	1 or 3W
PREAMP TYPE	GaAsFET	GaAsFET	Bipolar
PREAMP SWITCHING	Pushbutton	None	Wire Link
OVERDRIVE PROTECTION	Yes	No	No
OUTPUT METER	LED Bargraph	None	None
MOBILE MOUNT	Yes	Yes	No
5 YEAR WARRANTY	Yes	No	No

Although there are BNOS models for drive powers ranging from 1 to 25 Watts, they can all be driven by as little as 250mW – a useful feature which gives full control over the output.

Going the other way, what happens if you stick too much RF in? BNOS's unique overdrive protection feature means that, with too much input power, the unit automatically changes over and pretends that it's an expensive piece of coax. The others **eventually blow up** (After going horribly non-linear and making enemies for you both in and out of band)!

	BNOS	TOKYO	M MODULES
MODEL	LPM432 10 100	HL120 U	MML432 100
OUTPUT POWER	100W	100W	100W
INPUT POWER	10W	12W	1 or 10W
PREAMP TYPE	GaAsFET	GaAsFET	None
PREAMP SWITCHING	Pushbutton	None	N A
OVERDRIVE PROTECTION	Yes	No	No
VSWR PROTECTION	Yes	No	Yes
THERMAL SHUTDOWN	Not Required	No	Yes
OUTPUT METER	LED Bargraph	Moving Coil	None
5 YEAR WARRANTY	Yes	No	No

What about the preamps then? The MM low power units use a bipolar device while BNOS and Tokyo use **GaAs FETs**. By the time you get to 100 Watts they don't bother to fit one at all. And, of course, with the apparent popularity of PIN diodes, if your linear hasn't got BNOS written on it, you probably **can't switch the preamp** out of circuit (marvellous when you've got BIG signals around).

The BNOS 100 Watt Linears use a "**Push-Pull**" final stage. This has a number of technical advantages which result in a much cleaner, more efficient and reliable output signal. The thermal shutdown feature – of which Microwave Modules seem so proud – is **just not necessary!**

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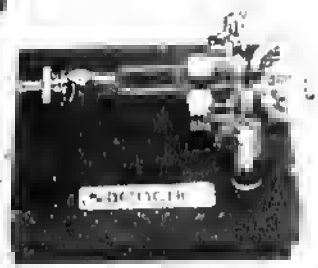

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Membership is open to all those with an active interest in radio experimentation and communication as a hobby. Applications for membership should be made to the secretary, from whom full details of Society services may also be obtained

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Affiliated club or society/registered group (UK): £18.50 (including *Radio Communication*); **£11.10** (excluding *Radio Communication*)
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ANNIVERSARY OPPORTUNITIES

"Strength in numbers" must have been very much in the minds of those who founded this Society in 1913. The realization that a united front could achieve more than the sum of individual effort has proven its worth in just about every walk of life; amateur radio is no exception. The RSGB, as the union for radio amateurs, has demonstrated the value of this philosophy. Those with a sense of history, including very recent history, will be well aware of the Society's achievements.

The RSGB has always been a society of the imaginative pioneer—those with the forethought to get on with the job and do what was required. Indeed the RSGB was a founder member of the International Amateur Radio Union (IARU), the organization which now links all of the world's 124 national societies in seeking common goals. Without the RSGB, without organizations such as the IARU, amateur radio today would have little substance and probably not many amateur bands. Our success has often been in thinking big and for not shirking our long-term responsibilities to amateur radio, even if the amateur-in-the-street has expressed little interest or concern for such work.

Big thinking is needed now to address all of those tasks which face the amateur radio community. These include: the encouragement of beginners, the need for better training, the revitalization of our field operations, the constant striving for improvement, both nationally and internationally, and the challenges faced by the prospect of another World Administrative Radio Conference to discuss frequency bands, which is likely around 1992.

Somehow the Society needs to convince the non-member that there is "safety in numbers" and get them to join. So many take the work of the Society, and their amateur bands and privileges, for granted. They forget or ignore the decades of effort which have gone into building up the amateur service.

In 1988 the Society celebrates its 75th anniversary. This landmark in our development is surely a golden opportunity for the Society to show off the best of amateur radio to the general public and to attract more newcomers to the hobby. In this, every member of the Society has a positive role to play. We want 1988 to be a time to reflect on our past but with our thoughts focused on an exciting future, much as our founders must have done in 1913.

David Evans, G3OUF

COMMERCIAL EQUIPMENT SURVEY

MEMBERS' USER REPORTS ANALYSED

Peter Hart, G3SJX; John Regnault, G4SWX; Giles Humpston, G4GYO, and Dain Evans, G3RPE

THE JANUARY 1985 issue of *Radio Communication* contained a questionnaire requesting information regarding members' experience with their commercial amateur radio equipment. Members were asked to answer 17 questions, including where they bought it, the modes they used regularly, their views on the good and bad features of the equipment, its reliability and so on. Some 800 replies were received, covering over 80 different types of equipment. Naturally, these have come mainly from the UK, but replies were also received from many European countries, Africa, South America and the USA. The field covered by this survey was deliberately not limited, and it was hoped to follow up with surveys of a more specific nature at a later date. The questionnaire was designed to give a broad picture of the experiences of a large number of users with regard to equipment expectations, effectiveness and reliability over an extended period.

Although the main point of the exercise was to collect data on individual equipment, the questionnaire contained much interesting information of a general nature. The first part of this report is a summary of the general information, followed by a discussion of more specific equipment-related aspects under hf, ehf/uhf and miscellaneous categories.

GENERAL INFORMATION

Members were asked to give their callsign (or RS number) if they wished. Over 96 per cent did so. Of these replies, 62 per cent were from Class A licensees, 29 per cent Class B, three per cent SWL and six per cent others (foreign licences).

Q3. Was equipment new or secondhand?

New	74 per cent
Secondhand	26 per cent

Q5. From whom did you buy it?

Authorized dealer	70 per cent
Non-authorised dealer	10 per cent
Trader at rally	4 per cent
From an amateur	16 per cent

When designing the original questionnaire, it was decided not to ask for the name of the dealer because it was felt that this might inhibit comments. However, one has the impression that a fair number presumed that the dealer was officially authorized when this may not be the case. The first two sets of data must be judged in this light.

Q6. Would you buy from the same source again?

Yes	82 per cent
No	7 per cent
Uncertain	6 per cent

That nearly one in five would not buy their equipment from the same source again seems to suggest a significant degree of dissatisfaction.

Strong criticism was levelled at the after-sales service (or lack of it) provided by one particular non-authorized dealer. On the other hand, two particular dealers were often praised for their friendly and efficient service. The practice of removing serial numbers by some dealers was also heavily criticized.

Q8. Modes regularly used?

The proportion of members regularly using the modes listed below were reported as follows:

CW	48 per cent
SSB	73 per cent
FM	43 per cent
RTTY	15 per cent
SSTV	2 per cent
Other	9 per cent

It must be remembered that this information refers only to one piece of equipment. However, since this was in many cases the main equipment, it does give an indication of the popularity or otherwise of the various modes.

These figures should also be viewed in the light of the approximate 2:1 split between Class A and Class B licences.

Q 13(a). Quality of the instruction manual

Poor	4 per cent
Fair	15 per cent
Good	34 per cent
Very good	31 per cent
Excellent	16 per cent

It seems fair to comment that, when dealing with commercial equipment, it is right to expect the highest standards. The fact that 81 per cent thought the quality of the manuals was good or better, and that 19 per cent thought they were at best fair, seems to suggest there is room for improvement. However, the proof of the pudding . . . . . See Q 13(b).

Q 13(b). How difficult was the equipment to get going?

Very difficult	1 per cent
Difficult	4 per cent
Straightforward	29 per cent
Easy	23 per cent
Very easy	43 per cent

These replies speak for themselves.

Q 14(f). Has the equipment needed servicing?

Yes	42 per cent
No	58 per cent

At first sight, the above figures are rather alarming. However, it must be noted that "servicing" included everything from replacement of burnt-out dial lamps, fitting new drive cords and replacing worn-out valves, often done by the amateur himself or by a friend at negligible cost, to repairs done by a dealer following a major failure. Many repairs were made without cost to the amateur by dealers—under guarantee—or in some cases, it is a pleasure to note—out of guarantee, although cost of transporting the equipment usually fell on the amateur.

With the benefit of hindsight, more detailed questions should have been asked which distinguished between normal wear-and-tear, repairs made under guarantee and those that were charged to the amateur.

However, we do have the figures that members supplied for the cost of repairs which they could not, or chose not to make themselves, and were not covered by guarantee. They are:

Number of repairs	96
Total cost to owner	£2,734
Average cost	£28

If these figures are accepted, and the question "What is the average cost of these repairs spread over the 800 pieces of equipment here reviewed?" is asked, then the average drops to less than £4. Continuing this argument, since the average age of the equipment reviewed is probably in the region of three years, then these figures suggest an average likely repair cost of about £1 per annum. This seems to be an indication of the remarkable reliability of modern electronic equipment.

Q 15. With hindsight, would you buy the same equipment again?

Yes	85 per cent
No	13 per cent
uncertain	2 per cent

These figures reflect the capacity of the amateurs to admit they made an unsuitable choice in the first place or their dissatisfaction with its reliability

or the service they received from the dealer. Perhaps most people would find an "85 per cent satisfaction" level reasonably acceptable. Some further light on this aspect comes from the following question.

Q 16. Would you buy other equipment from the same manufacturer?

Yes	90 per cent
No	6 per cent
Uncertain	4 per cent

It is probably fair to say that these figures suggest a general confidence in particular manufacturers, the slightly lower number of "Yes" replies to Q 15 being attributable to the specific equipment involved.

Additional comments

"Why doesn't RSGB have a Box No?" . . . "Instruction manual good, if you can read Japanese" . . . "If you can read the circuit diagram, I'll buy you a pint" . . . In reply to the question regarding source: "A gift from the manufacturer—I helped with the design" . . . Note regarding hole in questionnaire: "Sorry—out-of-control soldering iron" . . . From a questionnaire dated 17 January 1985 "My 15th wedding anniversary". So one *can* be an amateur *and* remain married . . . "I have had a lifelong interest in amateur radio and I consider that I have already had my £1,000 or so investment more than repaid in the pleasure I have had. . . . There is something for everyone in this fantastic hobby."

HF EQUIPMENT

The total number of replies received concerning hf equipment amounted to 379. Of these, 354 related to transceivers, 15 to receivers, nine to transmitters and a single reply for a linear (KW1000). Yaesu and Trio/Kenwood accounted for the large majority of received replies, and the split by manufacturer was as follows:

Manufacturer	Models	Replies
Yaesu	21	159
Trio/Kenwood	9	137
Icom	6	18
Ten Tec	8	27
Drake	5	19
KW Electronics	5	8
Swan	3	3
Collins	2	2
Misc.	3	6

General comments

The replies received cover a wide span of interest and opinion, and it is difficult in many cases to draw universal conclusions. In most cases owners were largely satisfied with their purchase, but what appeals to one person does not necessarily appeal to someone else. For example, the owner of an FT101 will often cite the tuned valve pa as a major plus feature, whereas the owner of an FT757 will cite the broadband transistor pa as an advantage.

Where not otherwise fitted, the most desirable additional facilities to have were notch filter, fm operation, twin vfos and full break-in. One respondent would like a switch to disable his neighbour's washing machine!

Specific equipment

Twelve models each gave rise to 10 or more replies, and these are analysed in greater detail as follows.

Yaesu FT101 series (all models)—60 replies were received; 16 for the early FT101/B/E models and 44 for the FT101Z/ZD. The Z and ZD versions are architecturally very different from the earlier versions and are treated here as separate models.

Yaesu FT101ZD

The early model ranged in age from 8 to 15 years and the majority of owners had purchased from new. Good features of the equipment were considered to be the ease of use with well-laid-out front panel, valve pa, built-in 240/12V psu and a high degree of reliability. Poor features were receiver dynamic range and sensitivity on 28MHz. Only half had required any form of service, mainly replaced rectifier diodes, pa valves, dirty switches and edge connectors.

The Z and ZD models included both six- and nine-band versions. Simplicity in use, lack of unwanted frills, rugged valve pa and well-laid-out front panel were considered to be the chief attributes, together with clean transmit signal, selectivity features and reliability. The most common answer to the question regarding bad features was "None" although a number commented on poor speech processor. The noise blanker was criticized and praised in roughly equal proportions! Eleven out of the 44 had required some form of service, mainly repairs under warranty. Specific faults mentioned were two pa grid capacitor failures (can cause fire!) and two inoperative crystals. The overall impression is a reliable and well-liked rig.

Trio TS830S

Trio/Kenwood TS830S—31 replies. Another popular transceiver which gave rise to very little adverse comment. The good features were considered to be excellent selectivity adjustment facilities, valve pa, general ergonomics and transmit audio quality. Good receiver performance and speech processor also receive a mention, although there were some comments on inadequate strong signal performance for night-time operation on 7MHz. Again, opinions differ over the performance of the noise blanker. Fourteen equipments had required servicing, mostly minor problems. The most common problem was vfo instability due to inadequate earth connections in the vfo. Other common problems were loose screws and connections and failure of pa components.

Yaesu FT102—29 replies. Listed as the good features were receiver performance, ease of use, triple valve pa, transmit/receive audio, selectivity control etc. The biggest problem with this equipment appears to be unreliability. Twenty of the 29 sets required servicing, some 3, 4 or more times. Most, but not all, were covered under warranty. The most common fault was thermal runaway and burnt out pa valves. It was reported that Sylvania valves suffer from this problem and the cure is to fit RCA. Other common problems were intermittent rf drive, mechanical faults in the tuning drive assembly, loose bolts, dry joints, three reports of burnt-out receive rf amplifier fets etc.

Trio/Kenwood TS530S—22 replies. The comments were broadly in line with those for the TS830S, bearing in mind that this transceiver has fewer facilities. Seven required servicing.

Trio/Kenwood TS430S—20 replies. Owners seem generally satisfied. The most-liked features were the small size, ease of use and general-coverage receiver. The poor features were the a.m performance, uncontrollable fm power output, lack of output power metering, and the usual comments about poor noise blanker. Five equipments required servicing, all minor problems repaired under guarantee.

Trio/Kenwood TS930S—19 replies. The best features of this equipment were the ease of use, excellent receiver, few facilities including full break-in, transmit audio, excellent control of i.f selectivity and twin vfos. Several reports regretted the lack of fm and the high price. Early sets purchased before November 1983 suffered from reliability problems, mainly dry joints and failure of plated-through holes on the digital board. These accounted for the majority of the eight which required servicing, but these early problems had disappeared completely by the spring 1984. Several reports commented that the service manual is excellent.

Yaesu FT757GX—14 replies. The good features stated were the compact size, general-coverage receiver and all features fitted as standard. Bad

features were the slow tuning rate, synthesizer clicks and inaccessible controls on the rear panel. Five required servicing, all under guarantee, and three of these were mechanical tuning drive problems.

Yaesu FT707—12 replies. The good features were small size, ease of use and a good receiver particularly on cw. The bar-type S-meter received some adverse comment. Of the 12 equipments, eight required servicing, with only one covered under warranty. The most common fault was failure of the pa transistors (three equipments) at a repair cost of £80–£100. One report suggested that the ale circuitry is inadequate and it is easy to overdrive.

Trio/Kenwood TS520—11 replies. This transceiver, which is now some 8–12 years old, appears to be very reliable. Good features were given as ease of use, easy access for servicing, excellent cw note and long valve life. Four have required servicing, all minor faults.

Drake TR7

Drake TR7—11 replies. The best features were given as a superb receiver with excellent selectivity and dynamic range, reliability and simple to use. Seven required servicing, the most common fault being transmit driver transistor failure (four equipments).

Ten Tec Argosy (525)—11 replies. The best features were given as simple to use and maintain, full break-in, notch and audio filter and the ability to run QRP. The lack of an rf gain control and poor dynamic range were the principal adverse comments. Four needed repair with various component failures.

Trio/Kenwood TS120—10 replies. The compact size and simple operation were the principal good features, but some receiver strong-signal overload problems were reported. Three sets suffered instability which was cured by tightening the screws on the rf board. This appears a very reliable rig overall. Its successor, the TS130, received nine replies with similar comments. Four required servicing with various faults.

Icom IC740

VHF/UHF EQUIPMENT

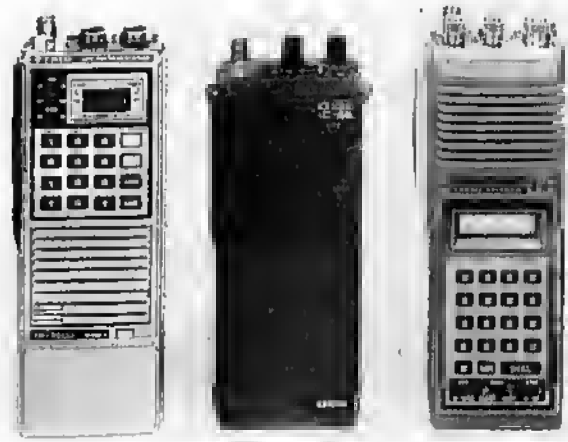
Some 240 of the user test reports concerned vhf/uhf equipment manufactured by the three big Japanese manufacturers. Many quite different and varied transceivers are included which, for the purpose of this review, have been divided into two categories: (a) handheld and mobile rigs, and (b) home station rigs, the majority of which are multimode transceivers. As there was only a limited sample of any particular transceiver, no statistical information will be presented; rather, overall tendencies of the various genders of rigs. The exception is the Yaesu FT290R. Sufficient replies were received to allow a more detailed analysis of this particular equipment.

The first conclusion on reading the reports was that the majority of users were on the whole satisfied with what they had. Despite this a large number commented upon a lack of sensitivity, and many had fitted preamplifiers. Only five replies said "Never again", although one wouldn't be surprised if someone who has spent over £1,000 on the latest gleaming Japanese wonder was unprepared to admit that he was wrong! After hearing many gripes over the air it was quite pleasant to note the generally high level of satisfaction from most respondents with the equipment they had. Users of cheaper, simpler equipment often wanted more extensive features that were included on the more expensive equipment; ie scanning, auto tone burst and the like, but many of the users of the expensive rigs replied that they didn't use these features. This seems to be true of many consumer items today from cars to washing machines, although it doesn't appear from the reports that the vhf fraternity are changing their rigs each year yet!

Handheld and mobile transceivers

For many recently-licensed amateurs the first equipment purchased is usually a handheld or mobile rig and from the many "secondhand" replies to Q3, the turnover of users of this type of equipment is very high.

The comments and complaints of the handheld users seem to have been well researched by the equipment manufacturers, most of the points brought out in the reports are claimed in the adverts as selling points of the latest machines. The biggest problem in this area is the compromise between weight, size, power and battery life; those without the higher power (1 to 2W output) wanted more, yet those with high power capability (3 to 5W output) wanted smaller and lighter rigs.



Hand-portables

There were some complaints from users of older handhelds with l.e.d displays that battery life was restricted, but some with more modern liquid-crystal displays complained of poor visibility. The whole area of size and weight of batteries is one that will only be changed in the end by development of smaller and lighter high-capacity secondary cells, and there is little that amateur equipment manufacturers can do other than make these compromises.

FM mobile transceiver users seemed well satisfied, with very few complaints or even comments voiced in the reports. The only comments made were, of small control size which hampered mobile operation, and of poor display visibility of rigs with liquid-crystal displays. Again if one glances through the advertisement pages, some of the retailers take pains to claim that their latest particular transceiver has got over these problems.

Base station transceivers

Of all the reports on transceivers in the base station category, the majority (over 80 per cent) were for 144MHz singleband rigs; of the rest, most were multiband units, and singleband 50 or 432MHz equipment only produced five reports. More features were liked by users, rather than disliked, the five most common are listed below although not in any order of preference.

(1) Large knobs, especially the main tuning dial, were very popular for both home and contest operation.

(2) For ssb and cw use, a free-tuning vfo rather than a stepped synthesizer was preferred, but fm operators preferred stepped tuning.

(3) Most users liked to have the facility of frequency memories with the emphasis on a few with easy access rather than many.

(4) 25W or more output was preferred to the earlier 10W "norm".

(5) On multiband rigs, full crossband duplex—especially for satellite working—was considered to be good on rigs with this facility and desirable on those without.

Two features of many of the transceivers, regardless of the manufacturer, were criticised; these were noise blankers and speech processors, both of which were often claimed to be ineffective. One complaint which only six of the reports mentioned was the lack of a cw filter

Yaesu FT225RD

option; considering the high level of cw activity on the vhf bands, the low number of comments is quite surprising. Of all the home station transceivers in the reports, no single manufacturer or rig could be singled out as being the optimum or totally to the users' liking. Many of the older transceivers, especially the Yaesu FT221 and FT225, were still popular with their users particularly those whose main interest was dx or contests, although there was a strong showing of Icom equipment in this area. Of the transceivers that could be fitted with Mutek front-end conversions, 80 per cent of the users reporting had done so. There were no complaints or adverse comments on these conversions, but this may be due in part to the lack of alternatives!

FT290R—60 replies. The majority of owners seemed largely happy with their purchase. The principal good features of the equipment were considered to be the versatility, ease of use, multimode provision, twin vfos, memories, scanning and large capacity battery pack. Many reports commented on the mobile mount and ability to use simply from the car, portable or from the home. The poor features listed included lack of auto tone burst, inadequate frequency step resolution on ssb, audio quality, display readability, S-meter and fragile/vulnerable antenna. Controls relegated to the rear and "fiddly knobs" also received some adverse comment but this is always a difficult compromise in a portable equipment. The majority of comments concerned the poor receiver sensitivity and limited dynamic range. Many owners had fitted a Mutek front-end, which improved sensitivity but further degraded the strong signal performance. Twenty equipments had required servicing: 10 of these were failure of the led backlight lamp (not an easy repair), seven required re-alignment (mainly frequency errors), four had pa faults, and three miscellaneous problems.

Ten Tec Corsair

General comments

It is very hard to draw conclusions on any particular model or make of vhf/uhf transceiver due to the wide range of equipment and small sample of each in the reports, but on the whole most users were happy. As has been mentioned elsewhere, the quality of the instruction manuals was thought to be good and the majority were satisfied with the dealer's after sales service.

As mentioned in the introduction to this part, comments about low sensitivity were voiced about nearly all of the equipments and many had fitted preamplifiers, this also accounted for five of the seven reports of poor strong signal handling. With this in mind there is still room for improvement in the noise figure of amateur vhf/uhf transceivers, and from the numbers fitting Mutek conversions and preamplifiers it seems that the users are prepared to pay the extra cost.

MISCELLANEOUS EQUIPMENT

This section includes reports on station accessories, transverters, test equipment, kits etc, and in addition some of the smaller or older manufacturers of hf and vhf equipment.

Reports were received on equipment from 39 manufacturers. These ranged from the better-known manufacturers, through the makers of some very specialized products, to some deceased companies which were in their heyday over 20 years ago. Nowhere on the questionnaire did it specifically ask for comments on solely amateur radio equipment and, sure enough, one report was received extolling the virtues of an automatic washing machine —the owner was well satisfied with its clean performance though the crease guard facility was rarely used!

The designers of the latest Japanese transceivers seem to have fairly fixed ideas about what facilities and features ought to be provided for the operator. Q 10 and 11 sought comments on the good and bad features of the equipment. The sheer diversity of manufacturers encompassed by the survey naturally produced several unusual features that could be of interest to many amateurs thinking of making modifications to their rigs; eg, front-panel side-tone pitch and volume controls, separately derived and switchable rf age, in addition to the usual i.f age, dual antenna sockets, 10W low distortion audio amplifiers and audio filters, to list but a few.

As most manufacturers were represented by several of their products, the number of reports per equipment was too low to permit statistically reliable conclusions to be drawn. Thus, it must be remembered that the analysed replies might not constitute a representative sample.

Summary of comments on manufacturers' equipment where more than 10 replies were received:

FDK—17 replies. Most of the user reports mentioned some fault occurring with the equipment during its first year of life. The vast majority of these were attributed to defective soldering, suggesting a quality control problem, but all were promptly repaired under warranty. The manuals for FDK transceivers were frequently praised for their clarity.

Heathkit—12 replies. The physical size of Heathkit equipment permits easy servicing and modification. Installing an rit was a frequently-mentioned modification. Aged valves presented the only problem with reliability. As many of these transceivers and receivers were originally supplied as kits, the accompanying manuals are particularly comprehensive, with the added benefit of not having been translated.

Mirron ave Modules—12 replies. MM products seem to be purchased by amateurs with an ear for the more exotic modes of communication. Favourable comments were made on the quality of their design and construction, but the manuals were often described as "atrocious".

Standard—11 replies. The owners of Standard transceivers believed their receivers to have the edge on sensitivity when compared against the competitors' products. The small, compact packaging of the transceivers was an attractive feature to mobile operators, but an equal number of reports complained that the controls were too small and too close together! Because Standard equipment is not as widely stocked by dealers as some other makes, obtaining genuine Standard spares, when necessary, was not always straightforward.

Overall, there was a clear trend that the older the vintage of equipment purchased, the longer the new owner was likely to keep it in his/her shack. Analysis of the replies indicated that the mythical "average" equipment was purchased approximately two years ago. Although the statistics are weighted by the sheer number of replies received on Icom, Trio and Yaesu equipments, even if these user reports are excluded the increase in ownership period is only 2·2 years. However, at the other end of the spectrum, the average ownership periods of equipment made by Heathkit and Eddystone are 8 and 11 years respectively.

The proven reliability of these older transmitters and receivers, the ease of servicing and "understandable circuitry" were frequently mentioned as positive attributes. The quality of the mechanical construction of these older rigs might have a part to play in their reliability. Phrases like "built like a tank" and "solid engineering" were used on several replies. It will be interesting to see how many of today's Japanese transceivers with their miniature controls, relays, switches and connectors will still be working in the year 2020.

CONCLUSION

This project has proved an interesting and enlightening exercise. It has shown that on the whole the amateur is satisfied with the products available on the market and with the overall service provided by the dealers. There are of course exceptions, with principal areas of concern being reliability of newly-released models and dissatisfaction over inadequate or badly executed repairs.

The wide field covered by the survey has yielded sufficient replies on only the more popular models to enable a detailed assessment of any particular equipment to be made. It is hoped to conduct further user reviews in the future on a more specific basis. □

THE AEA PK-80 PACKET RADIO TNC

P Cadman, G4JCP*

UK packet radio took a leap forward at the end of last year, with the licensing of the first batch of experimental 144MHz repeater stations. Such stations will eventually form the backbone of a UK packet radio network. You will need a tnc (terminal node controller) to take part in the packet experiments; one such unit is described in this review.

Introduction

Until recently, anyone wishing to become active on AX.25 packet radio had few options; either buy a terminal node controller (tnc) built or in kit form from the USA, or pay in excess of £600 for an imported top-line model. Homebrewing a tnc from scratch is not really practicable for, while the hardware is within the capabilities of an experienced constructor, the software required to fully implement the AX.25 protocol would probably take several months to write and debug. Recently the price of tncs has more than halved, to the point where the AEA PK-80 tnc costs significantly less than a typical 144MHz fm mobile transceiver.

Background

A brief description of the function of a tnc may be of assistance here, as packet radio communication is a little-understood facet of amateur radio. For a more in-depth treatise of the subject, the reader is advised to consult the references listed at the end of this review.

A tnc consists of a microprocessor and its associated support hardware, a modem, an interface to a vdu or computer and an interface to an amateur radio transceiver. The tnc accepts data in the form of seven or eight bit characters and transmits them using a standard amateur transceiver to a remote tnc, it then waits for an acknowledgement from the remote tnc. The tnc can also receive incoming data and send back acknowledgements as appropriate. Unlike rtty and similar character-oriented modes, the tnc arranges an accumulation of characters into a labelled packet before transmission. After sending one or more packets the tnc will wait for a corresponding number of acknowledgements from the remote tnc. If no acknowledgement is forthcoming for any particular packet then that packet is retransmitted until either an acknowledgement is received or the tnc assumes the communications channel has failed. A means of error detection known as a cyclic redundancy check (crc) is included in every packet. By comparing a locally-generated crc with the received crc, any errors in the received packets can be detected and the offending packets discarded. The crc is not 100 per cent reliable (no means of error control is 100 per cent reliable in the limit) but is more than sufficient for amateur and most professional uses.

Most tncs now available are capable of digipeating; that is, they are able to receive packets not addressed to themselves and retransmit them to either their intended destination or another digipeating tnc. For this to work, each packet has to include the callsigns of any intermediate tncs. Note that both the transmit and receive frequencies are usually the same; tncs time share a single channel, each listening for a break in the transmissions of other tncs before transmitting. A considerable amount of programming is required to fully implement the AX.25 protocol and this is where, for possibly the first time, the operation of a piece of amateur equipment depends primarily on software rather than on hardware.

First licensed as G8HHK in 1973 after some three years as an swl, and as G4JCP since the end of 1979, the author is a graduate of Aston University. After a brief encounter with industry he returned to Aston to do research on data transmission. During this period he became interested in the use of microprocessors, particularly their use in communication systems, and still pursues this interest within amateur radio. Professionally he designs microprocessor based fire alarm systems. When not in the shack he can be found wandering around local railway preservation establishments and disused railway lines.

*21 Scotts Green Close, Scotts Green, Dudley, W Midlands DY1 2DX.

Description

This section will cover the hardware description. The software will be covered later.

The PK-80 is housed in a metal case made from an aluminium extrusion with aluminium end plates and plastic surrounds. This style of construction ensures complete screening of the internal circuitry. The unit measures 150mm wide by 250mm deep and stands just under 50mm high including the supplied stick-on plastic feet. Power requirements are 10 to 15V dc, the review unit consuming 350mA at 13·8V. Five l.e.ds are visible through the front panel. These indicate: (from left to right):

Data carrier detect (dcd) status
The ptt (transmit) line state
Whether there are any unacknowledged packets in transit
TNC connect status
Power on

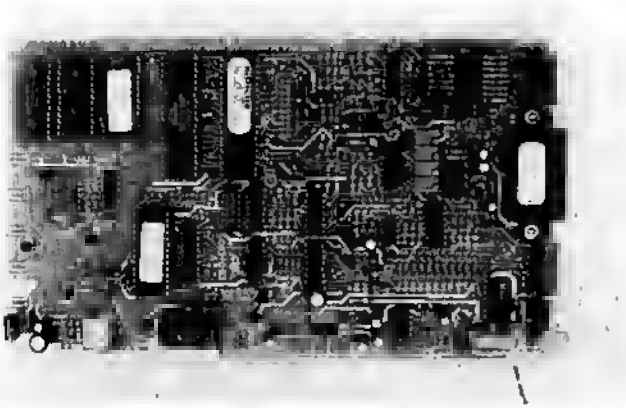
On the rear panel there are:

Power on-off switch
A 2·5mm power connector
An eight-way dil switch to set both radio and vdu baud rates
A 25-way D connector wired as an RS-232C modem
A five-pin DIN socket for connections to a transceiver.

The AEA PK-80

The apparent lack of external controls belies the actual complexity of the tnc. The internal modem is optimized for Bell 202 tones (1,200/2,200Hz) although it can be adjusted for other frequencies if desired. An internal adjustment is provided for the transmit audio level. The modem output is suitable for direct connection to the microphone or phone patch input of a transmitter, no additional filtering is required. A ptt line is provided which uses a power fet switching to ground. The receive audio passes through a switched capacitor bandpass filter before being fed to the demodulator. The microprocessor is a zmos Z80 running at 2·5MHz with 16 kbytes of eprom and 16 kbytes of ram. The ram may be increased to 32k by replacing the two 8k devices with a single 32k device. All the serial i/o is handled by a Z80 SIO, the non-return to zero inverted (nrzi) encoding and decoding being done by external logic. The modem is built around the EXAR 2206 tone generator and 2211 pll demodulator. The ram is backed up by a lithium cell with a life of several years; all operational parameters are thus saved while the unit is switched off. The RS-232C interface allows easy interfacing with a vdu or computer. Baud rates of 300, 1,200, 2,400, 4,800 and 9,600 are selectable. Radio baud rates (the rate at which the packets are transmitted over the air) of 300, 1,200 and 9,600 are provided. The 9,600 rate is not usable with the internal modem but is included for use with an external high performance modem.

The unit comes with a comprehensive instruction manual which runs to some 200 pages of full-size dot matrix print. It has an excellent index and



View of PK-80 circuit board

includes a full circuit diagram, component layout and parts list. The PK-80 is actually a Tucson amateur packet group TNC 2 clone which is supplied in the USA in kit form; the manual includes sections which relate to this kit and these may cause a little confusion. That aside, the only real criticism of the manual is its lack of examples about how to begin operating on packet radio. ICS seem to be aware of this and so include a photocopied sheet giving some guidance on initial operation.

Software description

This is where the complexity of the tnc really lies. There are more than 80 user configurable parameters and several immediate commands. Two types of connection (the way the tnc operates when sending packets) are supported. The first, known as converse mode, is an rtty-like mode intended for normal real-time QSOs where packets are sent at the end of lines or when a given number of characters have been entered. The second mode, transparent mode, is exactly that.

All characters are transmitted without any modification, either when a given number of characters have accumulated or else after a specific time has elapsed since the last transmission. Using this mode all 256 combinations of an eight-bit character may be sent. Similarly, received characters are not modified in any way, what is received is an exact copy of what was transmitted. Up to 10 converse mode connections can be active at one time, all incoming packets being displayed with an indication of the sender. However, packets may only be sent to one station at a time. AX.25 protocol is not really suited to traditional net operation. Only one connection is practicable in transparent mode.

Options are provided to allow the monitoring of both data and connect/disconnect packets, a further option allows the examination of individual packets down to the bit level. Normally packets will be ignored if the received crc disagrees with the calculated crc, this can be defeated allowing packets with errors to be examined. A beacon consisting of a single packet addressed to (usually) CQ or BEACON may be transmitted at regular intervals. Although the use of such beacons is somewhat deplored on busy channels they are of some use when calling CQ on what appears to be a clear channel. Once a connection has been made the beacon should be turned off. Another useful feature is the ability of the tnc to automatically send a pre-prepared message at the commencement of a connection.

The PK-80 may be run full duplex, naturally this will require a separate transmitter and receiver and a terminal (vdu or computer) also capable of full duplex operation. The terminal interface is software selectable for word length, parity and number of stop bits. Full or half duplex terminals are catered for and lower case characters may optionally be converted to upper case should the terminal not have lower case capability. Once switched on the PK-80 has a real time clock (rtc) facility. Unfortunately it is rather inaccurate and is only of use over a day or so. As it is a software rtc the time and date are lost when the unit is switched off.

Performance

The transmit waveform shows no sign of distortion when viewed on an oscilloscope, however, a regular pattern of 'spikes' is visible whether or not the tnc is sending data. These spikes are of short duration and so would not be expected to pass beyond the transmitter's microphone preamplifier stage. On receive the snr required to give a 50 per cent acceptance of packets of 80 characters length was 13dB. This was measured by additively mixing the received packets with band limited white noise and adjusting the snr to give as close as possible a 50 per cent acceptance rate. In practice the results obtained indicate that any channel giving a comfortable voice performance will be adequate for the PK-80. A receive preamplifier will, in most instances, effect an improvement in packet throughput as will a receiver that has good interference rejection. An audio level of 20mV across 10kΩ is required by the demodulator, more than this does not improve matters and an excessive level results in a reduced snr performance. It is important to adjust the transmit deviation correctly. If it is set too low the received signal at the far end will have a lower snr than optimum, if it is set too high the transmitter's deviation limiting circuitry may clip the modulating tones and so introduce distortion. This will have an adverse effect at the receiving end, in addition to being anti-social.

Operation

Actual operation is what really decides the success of a piece of equipment, few criticisms can be made of the unit in this respect. However, as with all tnes the PK-80 is not a plug-in-and-go unit. To achieve best results careful study of the manual and some setting up is required.

After unpacking the unit, interconnecting leads have to be made up, one to the terminal and one to the transceiver. As the terminal connector conforms to the RS-232C standard most commercial RS-232C leads will work. If xon/xoff handshaking is used then only three wires are needed; transmit data, receive data and common ground. The transmit tones and ptt line will usually be taken direct to the transceivers microphone connector. The manual shows what pin numbers to connect for most common rigs. Audio to the tnc can be taken from the external loudspeaker connector. Should this mute the internal loudspeaker then some means of aurally monitoring the received signal is recommended. An unfused power lead is supplied and although the unit is over-voltage and reverse voltage protected it is prudent to either externally fuse the unit or use a current limited supply of one amp or less. Setting the required baud rate is simple if fiddly. More of a problem may be the setting of parity, number of stop bits and word length which may not be the same as the published defaults due to the battery back up. Fussy terminals may require a little trial and error before communication with the unit is satisfactory.

Next the modulator tone frequencies and demodulator centre frequency should be checked. This requires the case to be removed and the pc withdrawn. However, before any adjustments are attempted a temporary heatsink, one or two crocodile clips for example, should be fitted to the tab of the on-board 5V regulator. This uses the PK-80s case as a heatsink and will get extremely hot if no alternative is provided. The transmit audio level can now be set to give the required deviation. The help of a local station should be sought if instruments or a second receiver are not available. These adjustments are not difficult for anyone with a modest constructional background, still, help from a local packet station is useful. Most packet activity is on 144·675 or 144·650MHz (digipeater network), and a quick call on phone on this frequency will normally produce an appropriate response. Packet qsos or connects as they are called can now be tried. As already said there are over 80 parameters that can be set, in the main the suggested defaults are acceptable, others will have to be set to suit the operator. One that has to be set is the station callsign. Without this the tnc will not function correctly.

Typing CONNECT G0ZZZ is all that is required to initiate a contact. If the station called is operational the message CONNECTED TO G0ZZZ will appear on the terminal, else the message RETRY COUNT EXCEEDED indicates that after several attempts contact was not established with the called station. Note the channel is not occupied except when packets are actually being transmitted or acknowledged. Thus there is normally no need to QSY, a single channel supporting many rtty-style contacts simultaneously. Only for large file transfers or bulletin board operation will a QSY be necessary. To terminate the contact the command DISCONNECT should be sent to the tnc. To digipeat through another tnc the connect command is modified thus: CONNECT G0ZZZ VIA G0YYY, G0XXX. Note the order of the callsigns should be the same as the intended path the packets are to take. The PK-80 allows up to 10 digipeaters to be included in this way. In practice any more than three to four digipeats can result in poor results due to the increasing probability of the packet and its acknowledgement being rejected somewhere down the line. Note that nearly all commands can be abbreviated to simplify typing. Unlike some earlier tnes the PK-80 has no cw identification facility. Current UK licensing requires a packet station to identify either in phone or cw at least every 15min. This is slightly crazy as every packet incorporates both the senders and recipients callsign. Because the PK-80s facilities encourage its use in unattended situations a hardware watchdog circuit is included in the ptt line. If by some chance the cpu crashes while keying the transmitter this circuit will release the ptt line after about 10s. Even with attended operation this is a welcome safety feature.

After many weeks of use the only way I have found to confuse the unit is to transmit large files while running the terminal faster than 2,400 baud.

Under these circumstances some characters can be lost. This is hardly surprising as the unit has to simultaneously receive characters from the terminal, transmit packets, receive acknowledgements and attend to all the background tasks it has to perform. It is possible to double the cpu clock rate, but if this is done the cpu and associated support chips should be replaced with higher speed devices. This has not been tried although I have heard of it being done without changing any devices. This is not really a sensible thing to do. The only reason it works is the over engineering of both the PK-80 itself and the devices used in it.

The PM-1 hf modem

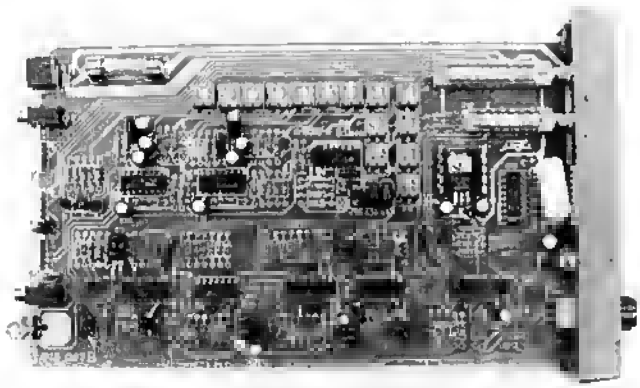
This unit is designed to match the PK-80 inc both electrically and physically. Its purpose is to convert the Bell 202 tone frequencies used on vhf and uhf to the 200 and 600Hz shift frequencies used on the hf bands. The unit incorporates all the switching required to use the PK-80 on vhf/uhf and hf without swapping leads.

Front panel of the PM-1 modem

Description

The case is of identical construction to the PK-80. The front panel carries a squelch control, a bargraph tuning indicator and two push buttons. One switches the unit between 200Hz and 600Hz shifts, the other is the power on/off and signal switching control. The rear panel has three 5-pin molex type connectors for linking the PK-80 and two transceivers. Also there is a power supply socket and two 3·5mm jack sockets, each in parallel with the received audio connect in the associated molex connector. A potentiometer adjustment is accessible controlling the transmit audio level.

Circuit-wise the unit is in two sections. The first takes the Bell 202 tones from the PK-80, demodulates them, and uses the resulting binary output to key a modulator. This produces 200Hz/600Hz shift tones which are routed to the hf transceiver. The actual tone pairs used are 2,310/2,110 and 2,310/1,710Hz respectively. Note the absolute frequencies are of little consequence as it is only the shift of either 200Hz or 600Hz which is important. Similarly, the selection of upper or lower sideband is irrelevant due to the use of suzi encoding. The second section consists of a pair of four-pole filters tuned to the hf tone frequencies and a demodulator which in turn drives a Bell 202 modulator. A tuning indicator is attached to the demodulator to assist in accurately tuning the hf receiver. The Bell 202 modulator is inhibited in the absence of a recognizable hf data carrier. The unit is supplied with a power lead and some lengths of screened cable, complete with molex connectors. A spare molex connector is included. The unit comes with a 15-page manual which includes a full circuit diagram and components list. Due to the unit's simplicity of operation few instructions are necessary.



View of PM-1 circuit board

Operation

Once the supplied leads have been fitted with connectors to match the vhf/uhf and hf transceivers, all that needs to be done is to set the amplitude of the transmit tones. As in the case of the PK-80, undermodulation will reduce the snr at the receiving end while overmodulation will cause distortion (and splatter) and have much the same outcome. Unfortunately the desire by the manufacturers to make the installation and operation of the PM-1 as simple as possible has had two annoying side effects. First of these is the difficulty of changing the baud rate between 300 baud, used at hf, and 1,200 baud. The dil switch at the rear of the PK-80 is fiddly to operate and one wonders how long it would last with frequent use. To get around this problem I fitted a single pole c/o switch on the front panel. The second annoyance came about when the PM-1 was first used on transmit. Having adjusted the audio output of the PK-80 to match the microphone sensitivity of the vhf transceiver, the level was found to be too low for the PM-1 to lock on to. Not wishing to adjust the transceiver's microphone gain control and thus have to re-adjust it when going back to phone operation, I isolated the hardware ded line and used it to carry a high level audio signal from the PK-80 to the PM-1. This modification can, of course, only be made if the hardware ded line is not used for its intended purpose and may nullify the guarantee of both units.

Despite the complex circuit of the PM-1 it works well. The bargraph tuning indicator is indispensable, allowing both tuning and adjustment of the receiver's audio level to be carried out easily despite the short transmission times of packet radio operation. In some installations, hash conducted out of the inc by the terminal and transceiver's connecting leads may be troublesome. Both leads should be screened and wrapped around ferrite rods or rings. As to be expected, the hash is more prevalent at lower frequencies. Hopefully manufacturers will soon filter all input and output connections to microprocessor-based equipments as a matter of course. The inevitable increase in costs this would incur would be acceptable if the problem of microprocessor hash can be banished from the radio shack.

Conclusion

In a sphere of amateur radio where standardization will have to be the norm rather than the exception, differences in tncs are likely to be small. However, in terms of packaging and ease of use the PK-80 has few faults. AEA's version of the TNC 2 design is as close as it is reasonable to get to a plug-in-and-go tnc without sacrificing versatility.

The PK-80 costs £239 and the PM-1 costs £185, both are distributed by ICS Electronics of Arundel. Prices include VAT and were current in August 1986.

Acknowledgement

I would like to thank ICS Electronics for their assistance in the preparation of this review.

References

[1] "Amateur packet radio, parts 1 & 2", Margaret Morrison, KV7D, and Dan Morrison, KV7B, *Ham Radio* July and August 1983; reprinted in *Practical Wireless* December 1983 and January 1984.

[2] "An introduction to data communication", P J Cadman, G4JCP, *Radio Communication* August 1984.

[3] "Packet Radio—the Software Approach", R M Richardson, W4UCH, *Ham Radio* September 1984.

[4] "Amateur packet radio", Peter Robinson, G3MRX, and Alan Jones, G8WJL, *Radio Communication* March 1985.

Note

Shortly after this review of the PK-80 was prepared, ICS Electronics announced an enhanced inc, the PK-232. This is in essence a PK-80 and PM-1 modem in one box with additional facilities for rtty, amtor, ascii and morse. Consequently much of this review will apply to this unit when it is used in the packet mode. Indeed, some of the criticisms mentioned when pairing the PK-80 with the PM-1 are negated with the PK-232 due to the operating parameters being set by commands from the terminal and not by the use of fiddly switches. However, the level of microprocessor-generated hash produced by the PK-232 was unknown at the time of writing. The PK-232 (five-mode terminal unit) costs £269.95, incl VAT, plus £3.50 p&p, from ICS Electronics.

As mentioned in the review, the PK-80 is a Tucson TNC 2 clone. Other TNC 2 clones are now available from several sources, these are (with the exception of supplied literature) close enough to the PK-80 to enable this review to apply to these tncs as well. Some suppliers offer kits, partial or complete; anyone constructing a tnc from such a kit is advised to contact one of the specialist packet groups if they encounter any problems. One of the aims of all these groups is to help newcomers to packet operation. Most groups can also obtain tncs at discounted prices. □

Technical Topics

by Pat Hawker, G3VA

CHAMBERS DICTIONARY defines "neophobia" as a "dread of novelty" and it is, I fear, a condition that to some degree afflicts us all with advancing years. We look back nostalgically to a time when radio seemed more understandable and the technology could be seen in terms of good or bad, with today's circuits and components clearly better than yesterday's, just as some people see "digital" as superior in all respects to "analogue".

In preparing *TT* I sometimes suspect that I am in danger of being considered a severe case of neophobia. Perhaps so. Yet my post suggests that many readers are finding themselves looking back to the days before the dominance of the black boxes not just with nostalgia but with the conviction that we are in danger of losing some of the elements that made amateur radio a truly unique hobby and turning it into just another branch of telecommunications, little more exciting than the humble telephone.

We should, we must, welcome new technologies where these truly serve us better; yet it is surely necessary to examine new ideas carefully and critically before accepting them as the greatest thing since sliced bread. What *is* important is that we give them a fair trial and not just reject them out-of-hand from dread of novelty.

Carrier shift data transmission

Bob Redding, G3VMR (September House, Cox Green Lane, Maidenhead, Berks SL6 3EL) has recently drawn attention (*Radio & Electronics World*, December 1986) to the possibilities of very narrow band data transmission on vhf using the technique of coherent direct carrier shift. He is anxious to encourage experimental use of this technique and is ready and willing to transmit data at 1200baud or more within a 2kHz channel bandwidth "if I can find someone to receive it".

He regrets that the reaction of many people, including professional engineers, to new ideas tends to be negative since he feels it essential for us to update our thinking to accommodate the new components and techniques that won't go away, adding: "this is where I think our hobby is so beneficial in fostering an open mind and providing a chance to try something new or see what else it might do. For example, a power or traditional electronics background can get in the way of semiconductor appreciation until we realize the significance of switching at the zero crossing point of a wave . . . we should be able to send data better on a (linear) radio circuit than on a telephone line."

G3VMR is clearly the reverse of a neophobe. I must admit to some personal reservations about high speed data transmission as a routine or widespread part of our hobby, but fully agree that there is every reason to encourage experimentation and the development of new modes, if only to justify our continued existence as authorized users of the valuable radio spectrum. Whether direct carrier shift transmission, decoded by means of a phase-lock-loop in the receiver (Fig 1), rather than the use of modulated tones on ssb or fm transmission is, or is not, the better approach (it could be argued that with 25kHz channelling still accepted at vhf there would be only a limited practical advantage in reducing transmission bandwidth to 2kHz), is open to question, though G3VMR is convinced that this is the case. Many years ago, in *TT*, I attempted to put the case for moving away from fsk for standard hf rtty and using two tone or multi-tone systems which have been shown to produce much better copy in the absence of diversity reception. The impact was virtually nil.

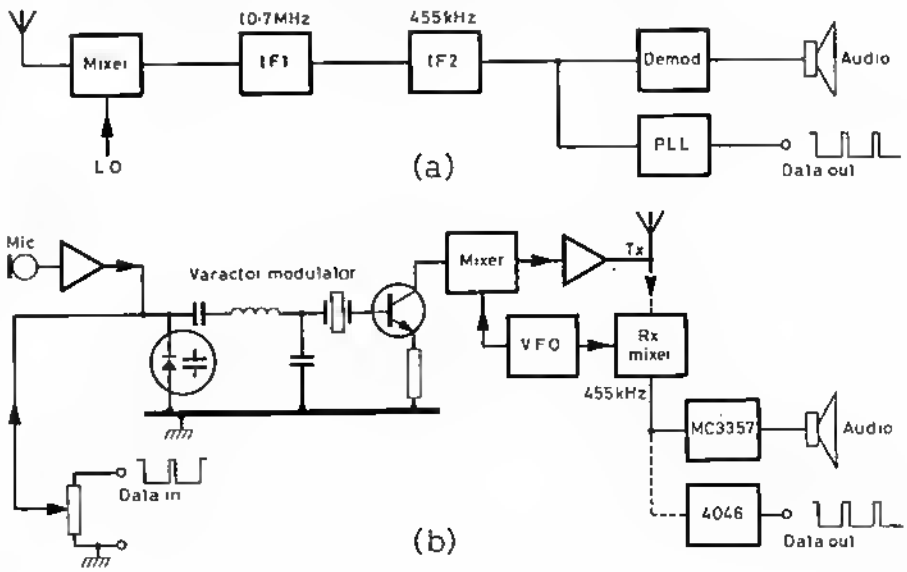


Fig 1. Bob Redding, G3VMR advocates direct carrier shift rather than audio tones from a modem for high-speed data transmission on vhf on the grounds of the much narrower channel bandwidth as well as its economic advantages. (a) A phase-lock-loop (eg 4046 cmos ic) is used in the receiver after the second i.f. but ahead of the fm detector to provide suitable output levels of the data signal. (b) Modification of a typical fm transceiver for carrier shift data

I agree with G3VMR that it would be a pity if we confine ourselves entirely to "tried and tested" approaches.

Sound advice?

Brian Davies, G3OYU, after reading the recent *TT* items on the effect of loud noises on hearing (*TT* June, October 1986 etc) writes: "I was born profoundly (by today's standards) deaf. I could hear after a fashion but was 15 years old before my disability was accepted by the medical profession. Three major ear operations and six on my nose have given me back a great deal of hearing. At best my hearing is 25dB down, at worst, eg when I have a bad cold, 39dB down. My problem is conduction deafness which is a mechanical fault in the conduction of sound from the ear drum to the cochlea. More common is perception deafness, a fault in the electrics of the hearing system, usually deterioration of the cochlea itself.

"Strangely enough, I have been fascinated by sound and reproduction since a small boy and for some 45 years have been constructing audio amplifiers and ancillary equipment, I have taken several courses concerned with acoustics and sound reproduction. Then, 14 years ago, I professionally entered the field of the high power music market, mostly in discotheques. During this time I have been involved in a number of seminars to do with the health hazard of entertainment noise including discos, pop and classical concerts. It is evident that there is a lot of emotional feeling against the high power music environment much of which cannot be substantiated. In this connection I have found a great deal of misunderstanding of the problem and my conclusions are extremely relevant to the amateur using headphones ("cans" in the music profession).

"Regarding the problem of noise-induced tinnitus, in a person with normal hearing it is often only a temporary effect which goes away after a period of time, usually overnight. The cumulative effect, however, over a period of years invariably results in noise-induced deafness. It is instructive to consider the spectra of sounds which are known to cause tinnitus and noise-induced deafness; ie gunshots, steam hammers, metal-working shops etc. Without exception the wavefront is extremely steep. In other words it is impulse sound which causes the trouble. The only way to get these kinds of sounds from audio amplifiers is with distortion and probably the quickest way to get this kind of distortion is to use a peak limiter circuit of two back-to-back diodes. A far superior way to avoid the problem, although much more complex, is to utilize one of the attenuator (age) ic devices which reduce volume rapidly but without attendant distortion.

"However, I am not convinced that it is necessary to limit the level of sound steep wavefronts. It is better to use an amplifier with very low distortion characteristics and with plenty of headroom to avoid over

loading. For ew a further refinement can assist both the distortion problem as well as the ability to read weak signals is to use a circuit which effectively rings and hence producing a near sine wave which by definition has no distortion products.

"There is evidence that distorted sounds will cause noise-induced deafness whereas undistorted sound probably will not. Until this is finally proved my recommendation is always only have sound levels at a level you can only just comfortably hear. Use audio amplifiers which have very low distortion products and enjoy what you are doing since the flow of blood around the cochlea is greater in the person enjoying what he is doing and this greater flow is in some way protective."

I must apologise to G3OYU for having edited down his very long letter but trust that I have retained the gist of his remarks. Personally I cannot entirely accept his advice not to use back-to-back diodes as peak limiters since the noises that I protect my ears against are invariably the loud switching clicks which I feel must have a steep wavefront and which would in fact be quite unbearable if there were even more headroom in my receiver af stage! In 1984 the BBC Designs Department announced, primarily for BBC staff, mono and stereo headphone protectors which took the form of small passive limiter circuits to protect the wearer against harmful sound levels from low impedance headphones such as the Pioneer SE550 and Beyer DT220. The limiting level can be preset to within the range 95 to 110dBA, though I gather that these ear protectors have never been widely used. For programme sound it may well be that G3OYU is right in warning against the use of peak limiters, but I still feel a need to soften those crashes and clicks that come out of my old receiver!

Small loop antennas

In December *TT*, Dr Andrew Smith, G4OEP, in taking exception to the term "magnetic antenna" when applied to compact transmitting loops, raised several interesting, if provocative, questions.

Tony Harwood, G4HHZ, agrees that in the *far field* of an electromagnetic field the E and H fields are in strict proportion (ie E/H is a constant, though not *c* in the usual sense of this being the velocity of light but 120π). However this does not apply to the *near field* of a transmitting loop where the magnetic field can predominate and perhaps justify the German term 'magnetic antenna'. He also, in answer to G4OEP's question "could a loop antenna radiate if it were enclosed in an electrostatic screen as most df receiving loops are?" says that the answer is undoubtedly "yes, it could and would". He points in confirmation to the classic text book on antennas: *Antennas theory and practice* by S Schelkunoff and the review of Lorentz's classic theory of reciprocity formulated in 1895 and derived from Clerk Maxwell's equations as described in last year's IERE's 11th Clerk Maxwell Memorial lecture by Professor A L Cullen.

The attraction of compact electrostatically screened loop receiving antennas in being much less susceptible to the electric fields of local electrical interference and, by dint of their directional properties, able to minimize co-channel interference from distant stations should not be overlooked by 1·8MHz and mf/dx enthusiasts. Following the recent items on transmitting loops two practical receiving designs have come from G3OUC and G8YZW.

Pat Painting, G3OUC writes: "For many years I have used kite-supported antennas for 1·8MHz field operation. Results have been well worth-while as far as transmission is concerned but severe problems have resulted on weak-signal reception from the pick-up of atmospheric and man-made noise. The same problem is also experienced when using my roachpole vertical antenna. At times rain-static can make it impossible to use 1·8MHz due to the receiver being swamped by noise.

"Various frame, loop and ferrite-rod active antennas have been constructed and all have worked quite well. However the shielded loop system shown in Fig 3 seems to give maximum noise reduction. All previous active antennas have picked up noise from the main station transmitting antenna if this is left connected. The shielded loop system works very well indoors and in suitable conditions provides reception of American and Russian stations; its directional properties can also be used to minimize noise and interference.

Mast guying

Bob Butcher, G3UDI presents a mast guying problem that has very practical implications. The question is; "If a mast is free to rotate about its base (ie masts not planted firmly in the ground) what is the minimum number of guy lines that should be used?". His answer (which came originally from a friend in the medical profession) is depicted in Fig 2.

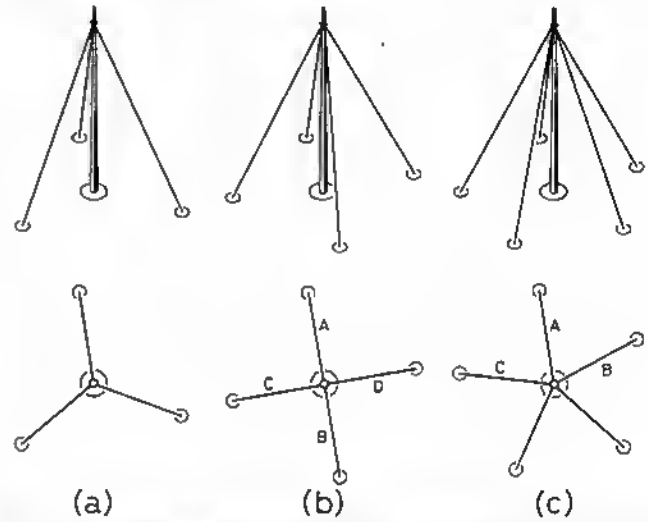


Fig 2. Minimum guying of masts that are not planted firmly in the ground needs not less than five guys to ensure stability in the event of one guy breaking (G3UDI)

(a) With only three guys the mast is unstable if one is broken.

(b) With four guys, the mast is still unstable if one breaks. This may not be obvious. Consider what happens if guy A breaks. The mast will start to

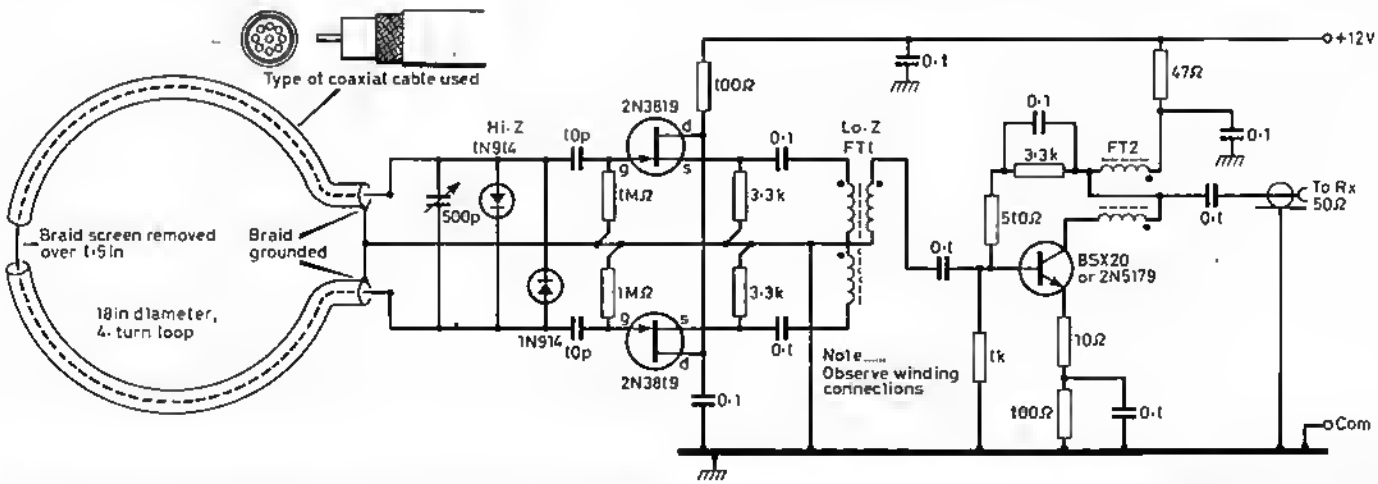


Fig 3. 1·8MHz "active" shielded loop receiving antenna used by G3OUC to minimize pick-up of local electrical impulse noise etc while providing good performance on weak signals. The 18in diameter four turn loop is formed from air spaced 75Ω coaxial cable. 1·5in of copper braid is removed at centre of cable. Loop is then taped with pvc electrical tape to secure turns. Tuned with a miniature broadcast type variable capacitor. Note that the loop is mounted vertically. For the broadband rf transformers, FT1 consists of 15t trifilar windings with 28swg enam wire on Amidon FT37-61 ferrite core. FT2 has 15t bifilar windings on similar core

move in the direction of B. Sideways guys C,D have *no* restraining effect as can be seen most easily if the *plane of the earth* is imagined to counter-rotate.

(c) Five guys thus seem to be the minimum number to ensure stability should one guy break. Suppose that A breaks, then B,C will still restrain the mast.

Passive 1·8MHz shielded loop

Mike Shepherd, G8YZW similarly writes: "I listen to several nets on 1·8MHz but have to contend with the background noises from electric motors and other sources of impulse interference which tend to be too fast to permit useful reduction by means of conventional noise limiters and often with several different electric motors being received at the same time from nearby woodyard, builders, launderette and vehicle coachwork rebuilders. Some of the nets use a.m which, when the signals are weak, is badly affected by the strong electrical interference.

"The *TT* item on loops prompted me to construct a Mark I version based on the impedance matching loop arrangement shown in Fig 3(c) page 706 of the October 1986 issue and the shielded "Indoor loop aerial for short waves" by S Mukherjee in *Electronics & Wireless World*, April 1985, pages 38 to 39, which describes receiving loops for 4–9MHz, 8–18MHz and 18–26MHz found to give more protection than a rod antenna against noise from electrical appliances. I scaled up the 4–9MHz version (700mm main loop diameter, 500pF tuning capacitor) to 1000mm main loop, 200mm coupling loop. But, possibly due to using H100 stiff coaxial cable (double screened) to provide some rigidity of the loop, found that the self-inductance and capacitance of the 10ft 4in length (including connecting ends) of the main loop required 750pF postage trimmer plus a 350pF sm fixed capacitor across the twin-gang variable capacitor (over 2000pF of which 1000pF is variable) as currently set to tune 1·85 to 2MHz. It could probably be converted to cover both 1·8 and 3·5MHz by switching in or out the extra capacitance. The 10ft version (Fig 4) results in a loop 42-inches wide. My next version will use 15–16ft of "ordinary" thick TV coaxial feeder cable to reduce the value of capacitance as well as improving performance generally.

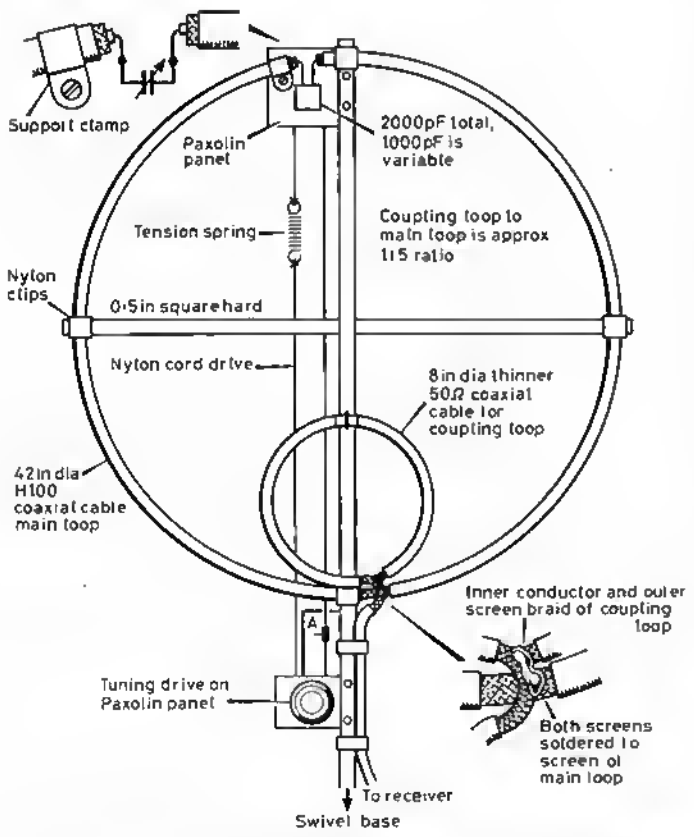


Fig 4. Prototype 1·8MHz shielded loop receiving antenna as built as a prototype by G8YZW. "Plastic" drive drum fitted to tuning capacitor. Aluminium drum to drive shaft and knob with small pulley wheel fitted close to cage to keep cord drive in line with "drums". At "A" a small calibration scale is fitted on wood shaft. Pointer fitted on inner cord with "card" scale fitted to take frequencies and/or stations for reference on removal

"Tests so far show it to be far 'quieter' with relatively little loss of wanted signal strength compared with a 50ft check antenna used with an atu."

Refurbishing valve receivers

Receivers such as the HRO, AR88, Super Pro, HQ129, CR100 etc built over 40 years ago, often for professional or military users, can still give an entirely adequate performance, particularly as few receivers. Admittedly, there will be significant switch-on frequency drift and the shape factor of single 455kHz crystal filters may look poor on paper in comparison with those fitted in modern high-performance receivers, but the "nose" selectivity and mechanical construction are excellent—or can usually be made excellent by touching up the alignment.

Of course, the rubber insulation on the heater wiring may have perished; emission of one or more of the valves may have fallen resulting in low gain. But the old style of chassis construction and "ugly" wiring makes refurbishing or modification a relatively straightforward job.

A likely problem with any receiver built before, say, 1955 is leakage of capacitors, particularly with old tubular foil and paper fixed capacitors. Capacitors with solid impregnants are generally unsuitable for use where ac or high dc voltages were concerned. Insulation resistance, particularly of cardboard-cased units, falls to relatively low value, of the order of at most a few megohms; phenolic-resin moulded capacitors were a little better but insulation resistance tends to fall in humid environments. Electrolytic capacitors have always been among the least reliable of components particularly when sited near to hot-running valves such as rectifiers or audio output valves.

Special care is needed when attempting to put any equipment back into use after it has been in store for months or years. All electrolytic capacitors tend to have a normal leakage current. When not used for a considerable time, such leakage will initially be very high and it will take about half-an-hour or so for the capacitor to "re-form". When first switched on the very high leakage current may seriously overheat the device with the possibility of its complete break-down and consequent damage to the rectifier, mains transformer etc. The answer is always to "re-form" any high-voltage electrolytic capacitor that has not been used for say one year, and after an even shorter time in hot or humid climates. The technique is to apply across the capacitor its normal working voltage in series with a resistor of sufficient value and wattage to limit the initial leakage current to a safe value. For example in the case of an 8μF, 450V working electrolytic capacitor a high-wattage resistor of, say, 10,000Ω would be suitable. This could comprise a couple of 15W electric-light bulbs in series. The applied voltage must be dc although not necessarily smoothed dc. Unless the capacitor has deteriorated beyond repair, after about one hour of "re-forming" leakage current should reduce to not more than about 0·5mA for an 8μF capacitor or, say, 2mA for a 32μF capacitor. It is easy to check initial leakage, using a series resistor, when replacing electrolytic capacitors; a little more difficult, but still reasonable easy to arrange to do this with the suspect capacitor *in situ*. Failure to re-form capacitors can lead to major damage to the equipment, including the messy business of having a capacitor explode.

Still a common fault, even with modern equipment, is failure of the dial (pilot) bulbs. Replacement is usually a simple matter but there are some designs where this can prove quite tricky; the same may be said of the dial cords that so often broke in the days before nylon cord was generally adopted.

Robert B Kerr, GM4FDT in "Valved receivers—further thoughts" (*Practical Wireless*, January 1987, pp26–7) offers tips on restoring older receivers. He notes that loss of emission of now-rare (or expensive) valve rectifiers can be overcome very simply by substitution of silicon power diodes, but that if this is done some precautions are most advisable. One

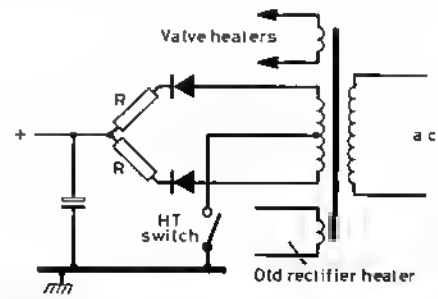


Fig 5. There is a need to take precaution with replacing valve rectifiers with silicon diodes to avoid the initial switch-on and high running ht problems. Add an ht switch and suitable resistors

is that the silicon diodes apply full ht across the electrolytic-filter components and the receiver valves, etc immediately on switching on; an ht delay device is thus advisable. This can be a manual ht switch as shown in Fig 5 although some form of delay mechanism that functions automatically overcomes the problem of remembering to have the delay switch "off" whenever the receiver is turned on. He also reminds us that with silicon diodes the ht line is likely to be some tens of volts higher than with the usual valve rectifier (with significant internal resistance) unless series resistors are added. To satisfy peak-inverse-voltage (Piv) requirements he advocates the BY127 diode with its 1250 Vrrm, 1·5A rating.

Unless such precautions are taken, the fast switch-on and high off-load voltage can prove fatal for the electrolytics, even if these have been reformed. It is often stated that a 450V electrolytic capacitor if used over a long period at a working voltage of say 300V or 250V tends to "memorize" the lower voltage and is likely to blow if say 400V is applied.

As mentioned earlier, leakage through older style fixed capacitors can be a problem and all old bypass and intervalve coupling capacitors may need replacing as they may easily affect the performance of the receiver. Intervalve coupling capacitor leakage results in positive bias being applied to the control grid of the following stage; dried out electrolytic cathode bias capacitors may reduce gain due to negative feedback, open-circuit reservoir capacitors are more likely to reduce ht than to cause hum; hum may be induced by leakage between cathode and heater within one or more valves. This may all sound like calling for major overhauls but in practice the open, reasonably spacious layout of many of the better old models makes such refurbishing well within the capabilities of most amateurs, even when equipped only with a multitest meter and a few tools. Re-alignment of a good communications receiver does require more care and the availability of a signal source (not necessarily a pukka signal generator although this helps).

The above comments, it should be noted, apply to those who wish to restore receivers in order to *use* them. Collectors of vintage models, on the other hand, seek to restore models without altering their appearance and using, if possible, genuine components of the appropriate period. But even so there are some tricks of the trade such as fitting new capacitors in the larger cases of the original components (see some tips by G4XWD on restoring ex-WD equipment in *TT*, June 1986, p420).

Resonant reed headphones

Among the correspondence arising from various mentions in *TT* of the use of small tuned reeds in headphones was a letter from F P Hughes, VE3DOB, editor of the *Canadian Amateur Radio Magazine*. He wrote:

"Your remarks (*TT*, March 1986) on reed headphones as an April Fool joke rather took me back since I recall reed headphones were once made commercially. To make sure that this was not my imagination I built a reed headphone. I soldered (acid core solder) a one inch length of clockspring to one pole of a cheap headphone, leaving a minimal gap between the spring and the other pole.

"It works well. I have not yet been able to measure its response, but by ear, there is a doubling in signal strength by a change of a whole tone up, and a halving by a further tone up. That is, if doh is 0dB, re is 3dB, mi is 0dB.

"I was able to follow cw at 30wpm (my maximum, not the phone's). The background 'noise' is a tone. Voice transmissions are unintelligible. The vibrations of the reed are swiftly damped by the magnetic field.

"It is interesting to tune through closely spaced cw signals. Several are heard at once, faintly. On tuning slowly, first one and then another 'pops up' into prominence. Tuning on 14MHz is critical, as you may guess.

"A usable pair of reed headphones would need controls for gap, at least one of the pair would have to operate a diaphragm. The 0·25 by 1in reed is not loud to the ear—like an o-v-o, but cw is perfectly intelligible. A diaphragm would increase both the volume and the damping.

"I was saddened to learn that *QST* treated this subject as a joke."

More pcb tips

While it needs to be recognized that for valve equipment "ugly" construction using connecting wires or Veroboard-type panels is still perhaps to be preferred, there is a vast amount of equipment for which the printed-circuit board is dominant, with the prospect of an increasing amount of surface mounting technology and hybrid thick-film or thin-film modules.

Two more pcb tips come from Dr Patrick O'Horan:

"(1) Having prepared a clean copper clad board with etch resistant pen or transfer, instead of immersing the board in etchant, float the board copper side down using surface tension. If the board is placed carefully with no air bubbles, the waste products are drawn away by gravity and the board etches much cleaner and much quicker. There is also less chance of transfers lifting as can be the case with constant aggitation of the fluid.

"(2) There are solutions available for 'silvering' pcbs to give that professional and protective finish. Indeed the process of silvering can turn a tarnished but well made board into a professional durable board. The solutions available are expensive and produce few boards for a considerable expense! I clean my boards well with a cream cleaner such as used in most homes (Vim or Ajax) after etching. I then thinly spread 'Plyolux' solder paste over the entire face of the board. This solder paste is widely available at plumber's merchants and is used for 'wipe' jointing lead pipes, a small tub is about £5 and will silver tens of boards if used sparingly.

"Having applied the paste, a hot air blower (paint stripper) is played on the surface until the solder flows evenly, if a blower is used do not be afraid to apply the heat for the time required for a smooth even finish. When cool merely wash in water and the water soluble flux will dissolve away taking the solder globules not attached to copper with it. If a hot air blower is not available then a blow lamp may be used but be careful not to scorch the board. As with commercial boards, fibreglass based board gives better results because of its better heat tolerance. I have found it better to dull and de-burr the board before starting to silver rather than dulling afterwards but this is possible. I have made many boards in this way and have even soldered up complete boards with the components in dry position but this is fiddling and not really of value to the amateur. I hope these notes have been of use."

Pi-network antenna tuner

While there continues to be a debate over the merits of the various "ultimate transmatch" configurations, it should not be forgotten that transmitters intended to feed directly resistive 50Ω coaxial feeders can be matched to end-fed multiband long-wire antennas, including the so-called "AoG" (Act of God) random length types, using either the simple two-element L-network or the long-established three-element pi-network.

Back in a 1960 issue of *GE Ham News* (in the heyday of the valve era both RCA and GE issued regular amateur-radio technical bulletins), S E Johnson, W2FBS, attempted to revive interest in the pi-network as an effective method of matching the low-impedance output of a transmitter to antenna feedpoint impedances of the order of 100 to 2,400Ω of long-wire multiband antennas. He provided constructional details of an atu suitable for use at powers up to 1kW on bands from 3·5MHz to 28MHz. With the restricted range of impedance ratios specified there is no requirement for high-voltage variable capacitors of more than about 350pF maximum capacitance.

Fig 6 (a) and (b) shows the two versions described by W2FBS; (b) with the coil tapped every two turns permits a more accurate impedance match and would be more suited for use with solidstate amplifiers than (a). Even more precise matching could be achieved with a variable ("roller coaster") inductance, though this would add to the cost unless a junk-box item. Special care should always be taken when attempting to use end-fed long-wire antennas with solidstate amplifiers unless these are well protected against looking, even temporarily, into a transmission line with a high swr.

There is still some controversy about how much or how little harmonic-suppression can be achieved in practice from any low-pass filter unless this incorporates a cross-over network and dummy load to absorb the harmonic

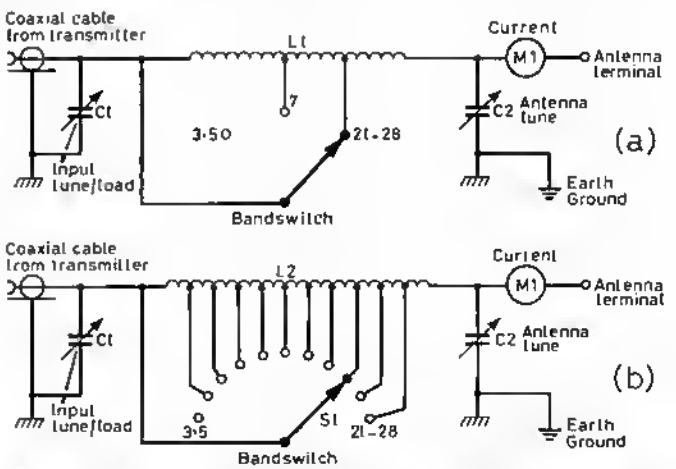


Fig 6. Pi-network antenna matching units as described by W2FBS in 1960 for feeding long-wire end-fed antennas. C1 30 to 350pF. C2 high-voltage 20 to 200pF. (a) L1 15μH, 20t, No 10 tinned wire, 3in diameter, 3·75in long with 10t wound 4 turns per inch and 10t wound 8tpi (1·25in long). M1 0·4A tsd rf thermocouple-type meter (but see text for low cost substitute). S1, 4- or 11-position heavy duty ceramic insulated switch for tap selection

power (absorptive tvi filters as described in past issues of *ART* and *TT*). But at least the pi-networks of Fig 6 are in the form of lpf filters and should not enhance the harmonic content! Preferably a standard multi-section 50Ω lpf tvi filter should be interposed between transmitter and the pi-atu unless filters are built into the transmitter.

W2FBS recommends that capacitor C1, on the low impedance side of the network, should have an air gap of about 0·03 inches when used with power amplifiers having up to 1·5kV ht, with C2 having a larger air gap of about 0·07-inches per 1000V on the amplifier. In practice, for typical 100W hf transceivers C1 can usually be a salvaged broadcast valve-receiver tuning gang which can provide some 1000pF (two-gang) or 1500pF (three-gang) capacitance thus extending downwards the impedance range of the atu.

It is worth remembering that, even with an exactly resonate end-fed antenna with its high-impedance, high-voltage feedpoint there will always be current fed to the antenna. Adjustment of an atu for maximum current or maximum voltage or both is thus an effective way of "tuning-up" a pi-network in the absence of an swr meter.

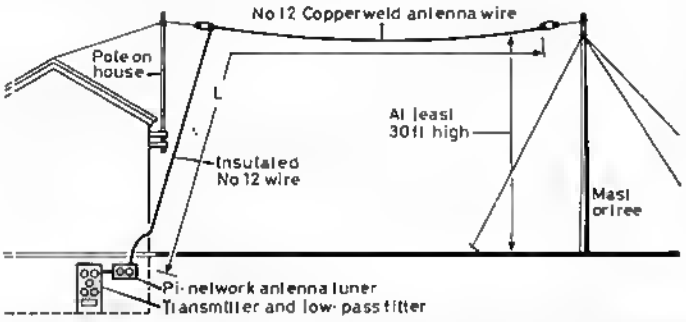


Fig 7. 243ft end-fed antenna as used by W2FBS (134ft is perhaps more typical for residential gardens) preferably with horizontal section 30ft or more above ground. A short heavy lead should connect the tuner to a good earth, although a counterpoise wire may be more effective for shacks above ground level

Since it is all too easy to burn out rf current meters, particularly on the higher hf bands, a satisfactory substitute can take the form of a torch bulb shunted by a few inches loop of wire. With a little trial and error the length of the shunt can usually be adjusted so that the bulb lights to some degree on all bands, though with low power it may be necessary to disconnect the shunt on the lower frequency bands. For his unit, W2FBS specified an 0·4A fsd thermocouple type rf ammeter, but I cannot believe this would always cope with 1kW amplifiers on the higher bands. I have to confess that many years ago I burnt out several thermocouple rf meters (they were then converted into dc meters) and decided that an occasional burnt out torch bulb was altogether more acceptable.

The W2FBS unit was intended for use with a 243ft wire on 3·5, 7 and 21MHz with a short, direct earth lead as in Fig 7. He pointed out that an swr meter in the coaxial cable link between the transmitter is handy (but not essential) for initially determining the correct settings for C1, C2 and S1 for each band.

Valves in transmitters

For umpteen years, the thermionic valve or American "tube" has enjoyed a deserved reputation for ruggedness and reliability over a reasonable operational lifetime when used in hf and vhf transmitters. The types introduced in the 'thirties and 'forties for hf, before the days of high-gain, closely-spaced electrodes and high-perveance cathodes often seemed to soldier on for ever, even when the manufacturers' published ratings were exceeded — though there was often a marked difference in the permissible degree of over-running between valves of the same type but stemming from different manufacturers. A couple of years ago I quoted, I think it was Brian Kendal, G3GDU, as suggesting that the only way you could be sure of killing an 807 was by hitting it with a shovel. Past experience suggests that, alternatively, lack of ventilation and consequent very hot glass envelopes can result in "gassy" ionized 807s or loss of vacuum due to cracked glass envelopes without resorting to the use of a shovel, but at least there was no need to protect them from high swr etc! I do recall an 813 physically breaking but that was due to it jumping out of its socket in the course of being taken in a signals vehicle along cobbled roads in France.

Valves introduced since about the mid-fifties and the use for rf linear power amplifiers of valves designed for television line-output ("sweep") applications did bring about the need for more care. Ceramic valves such as 4CX250-series also introduced the need for forced air-cooling and precautions against flash-over, though extending frequency range to vhf/uhf.

In the December *TT*, LA8AK warned of the problems experienced in Scandinavia by both professional and amateur users of the RCA 8122, with its proneness for short-circuited electrodes.

LA8AK's remarks have been endorsed by John Matthews, G3WZT who writes: "Some time ago I obtained three 8122 power tetrodes, brand new and boxed. On paper, these looked to be an excellent choice as a single-valve 144MHz pa. The valve has a very short grid-base and inspection of the constant current curves seemed to show it to be an excellent choice for linearity.

"I duly designed and constructed an amplifier using a single 8122 on 144MHz. All of the manufacturer's recommendations were followed including impedance-limited ht supply, stabilized screen-grid supply with overcurrent trip. After many hours slaving over a hot soldering iron, it was ready to go. Everything had been pre-tuned and neutralised; three minutes allowed for cathode warm-up prior to applying anode/screen volts. After a few seconds of rf, there was the sort of noise nobody likes to hear and the pa 'died'. Just as LA8AK described, G1 and G2 had short-circuited. After thoroughly checking power-supply sequences and voltages, a second 8122 was put in. Once again the same sequence of events and inspection showed G1/G2 s/c.

"Consultation with the manufacturer (RCA) proved no help (I am not a 'professional' customer!). Inspection of the tubes-insides, showed that large lumps of the cathode had 'vaporized' for no apparent reason. Later I changed the bias and socket to suit 'a good old 4CX250B'. The amplifier performed faultlessly and has been doing so for the past four years. I wonder how many others have trodden this same path with the 8122 and wondered why? I *still* wonder why; maybe RCA know!"

Lightning protection

J Lambert, G3FNZ noted the various comments in *TT* on protection against the emp problems arising from local lightning. He draws attention to an SMC leaflet on (a) a coaxial lightning arrestor in the form of a gas discharge model LA1; and (b) various static discharge devices, type DDL 14A/1 line transformer and type 2D1.01 high pass filter marketed by SMC. Of the coaxial arrestor for low power operations he writes:

"This unit has been used in the Far East, where lightning is prevalent, for several years with great success but unfortunately calls for a very tight vswr situation (1·5:1 between 1 and 20MHz) and are decidedly expensive (about £75). These devices are made in the USA".

The LA-1 is a surge arrestor designed for insertion in 50 and 75Ω coaxial rf transmission lines and designed to prevent significant static build-up on the antenna and transmission line thus reducing the incident probability of direct lightning strokes. It is claimed safely to by-pass to ground 10 or more direct or secondary strokes of lightning without damage to transmitting or receiving equipment.

Tips and topics

The Vackar oscillator turned up again in *Electronics & Wireless World*, June 1986, page 52 where P Hall describes it as a "reliable lc oscillator" commenting "lc oscillators can be temperamental. Either they require experimentation with circuit values to make them oscillate or they are complicated. This one (Fig 8) is guaranteed to work, tunes from 2 to 10MHz, is stable and has low harmonic output . . . ideal as the vfo for a transmitter or receiver."

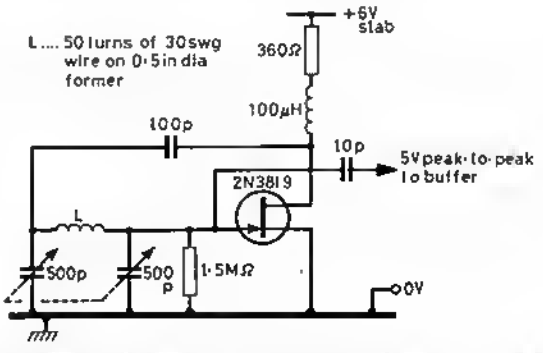


Fig 8. General-purpose stable Vackar vfo covering about 2 to 10MHz with component values shown

Francis Rose, G2DRT mentions that Heathkit no longer stock their time delay relay (as used on the SB230 linear amplifier) part number 69-74 RY2 but that Colomor (Electronics) Ltd will make one up in a base ready to plug into the SB230. □

RSGB NATIONAL VHF CONVENTION

Sandown Park Racecourse, Esher, Surrey

Sunday 26 April 1987

- **One-day exhibition and lecture programme**
- **Presentation of trophies**
- **Comprehensive trade exhibition**
- **Exhibition by specialist groups**
- **Equipment test facility**
- **Full fecture programme on vhf, uhf and microwave subjects**

PROGRAMME

1030 **Convention opens.** Entrance through racecourse turnstiles. (Open to exhibitors from 0800 through special exhibitors' entrance)
Refreshments. Snack bar in the hall will be open from 1100 to 1600, and the licensed bar will be open throughout the convention.

1330 **Convention address and presentation of trophies** by RSGB President Mrs Joan Heathershaw, G4CHH

LECTURE PROGRAMME

Detailed arrangement for lectures will be notified on arrival

	Stream A	Stream B	Stream C
1415	"Equipment evaluation", Angus McKenzie, G3OSS		"Phase-locking techniques for narrow band", Les Sharrock, G3BNL
1515	"Is your linear all its cracked up to be?", John Regnault, G4SWX.	"The Cellnet system", Malcolm Appleby, G3ZNU	"Hitch-hikers' guide to 13 and 9cm", Dave Robinson, G4FRE
1615	VHF Committee forum. Includes a report on the IARU Region 1 Conference by Keith Fisher, G3WSN	"Receiving weather satellites", Henry Neale, G3REH	Microwave Committee forum
1715		AGM of the Remote Imaging Group	
1745	Lecture session ends		
1800	Trade exhibition closes. Convention ends		

ADMISSION

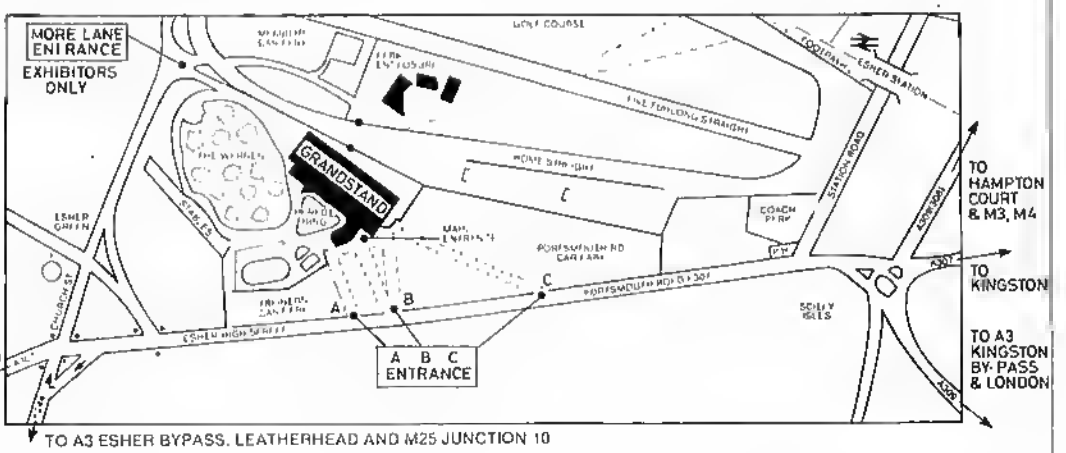
To simplify management and to reduce costs, it has been decided not to issue admission tickets for this convention, either in advance or at the gate.
Admission will be by payment on entry as follows:

Convention and exhibition £1
" " " (under 18)..... 50p
" " " (under 14)..... Free

RAIL TRAVEL

Please note that British Rail's Esher station is closed on Sundays. One alternative is to go by British Rail to Kingston and then take a 218, 537 or 715 bus to Sandown Park.

ACCESS MAP TO SANDOWN PARK



Map by courtesy of United Racecourses

NEWS BULLETIN

RAYNET in the thick of it

A report on RAYNET's activities during mid-January

By the time you read this it'll probably be an awful memory but the period 13-17 January produced some exceptionally nasty winter weather. Large areas of the country were under several feet of snow and many people were snowed-in or got stuck on impassable roads (chez GW4FRX the outside air temperature reached -14 degrees one night and the gas-fired central beating bottles froze up.... thinks, this Welsh hillside is a wonderful VHF site but there are limits!)

It was obvious that the difficult conditions were going to cause RAYNET to be busy and a number of RAYNET groups to be called out. Reports came pouring into Headquarters and from the mass of paper here's a round-up of what went on:

Leicestershire - RAYNET members operated the usual "snowdesk", which is a travel information service for the benefit of both mobile radio amateurs and the community at large and runs in close conjunction with the CEPO. The area covered ranged between Birmingham, Newark, Sheffield and Luton. The service ran for about 40 hours over a period of four days and some 3,000 messages were passed - the majority via GB3CF. QRT was at 1800 on 16 January.

West Midlands - groups were placed on a listening watch by the CEPO on 13 January. They were tasked with maintaining a listening watch and information gathering service concerned with road conditions and to pass the information on to the County Fire Brigade, which had requested the service. The operation was mounted using GB3AM, GB3BM and GB3BX and simplex channels to all County groups. A listening watch was also maintained on other Midlands repeaters. The groups were stood down by the CEPO on 16 January and were advised that the service had been of vital importance to the Fire Brigade.

Norfolk and Suffolk - RAYNET was called out by the Police and the CEPO and, via the latter, the Ambulance Service, the local health authority, the social services department and the highways department. The county of Norfolk was particularly badly affected by the weather and RAYNET groups provided vital communications, maintaining Rover Rescue and RAYNET Land-Rovers working back to police stations. They were involved amongst other things in getting patients and consultants to hospitals, taking urgent drugs to doctors and patients, taking baby's milk, fuel and provisions to various parts of the county, a search for a missing person and surveys on behalf of the highways department. The total activity exceeded 6,000 RAYNET man-hours.

Other groups active included those in Sussex and south Gwent, on behalf of the Red Cross and CEPO respectively. Groups put on standby included Oxford, Surrey and west Devon.

RAYNET also had a busy time in Scotland.

In Strathclyde, RAYNET was called out by the CEPO on behalf of the regional social services department to assist with communication-controlled transport. Members of the Strathclyde (Glasgow) and Lanarkshire groups

(cont next page)

Minister to open RSGB Convention

It's been confirmed that Mr John Butcher MP., Parliamentary Under Secretary of State for Industry, will open the RSGB's National Amateur Radio Convention at Birmingham's NEC on Friday the 27th of March.

This is an indication of the keen desire of the Society and the DTI to work in conjunction with with each other, not only for the long-term good of amateur radio but as a means of promoting the British electronics industry through this hobby activity.

The May issue of Radio Communication will carry an interview with the Minister and a full colour cover photograph of him opening the convention.

In the centre of this month's issue you'll find a four-page colour preview of the convention.

If you or your local club are intending to run a trip to the convention, there is still time to book your tickets in advance. The minimum order is 20 tickets and we'll give you one FREE ticket for every 20 purchased. Send your cheques to RSGB HQ (marking the envelope "NEC Tickets - Circulation Department) by first post 13 March. Those arriving early at the convention may purchase tickets at the booth outside Hall 3a, from 9.30am.

(cont from previous page)

provided five 4-wheel drive vehicles which were able to gain access to areas impossible for conventional vehicles. As well as message handling, tasks undertaken included the delivery of food parcels, 50 pence pieces for meters, the transport of DHSS officials making payments, deliveries of coal and Calor gas, staff transport, the checking of pensioners and others at risk, collecting donations of blankets and delivering them to those in need of them, collecting abscondees from police stations and returning them to children's homes and lots more. GM8KWQ also delivered a baby - from hospital to its home, we hasten to add.

The area covered was between Garelochhead, Kirkintilloch, Harthill and Kilmarnock. The Army was also operational, and apparently there was a good deal of friendly rivalry to see which organisation could do most jobs. On one occasion, RAYNET ended up helping in the search for a lost Army Land-Rover.....

Chairman of the RAYNET Committee Geoff Griffiths, G3STG, offers many thanks to all not involved for their efforts in keeping frequencies clear and general tolerance and forbearance.

Turbine flutter?

If you're a VHF/UHF addict living in a remote spot, beware - you might have another source of drastic QSB to contend with soon.

More and more use is being made of various forms of wind-driven generator to produce electricity and an installation of this type was recently installed at Burgar Hill, Orkney. However, both the BBC and the IBA were deluged with what they tactfully describe as "vigorous complaints" from TV viewers not long after it started operating; apparently signals from the transmitter site at Keelylang Hill were pretty well unwatchable in some places. It's since been discovered that the turbine blades - which are about 20 square metres in area - are made of glass fibre which is reinforced with steel struts. So as they rotate they scatter short wavelength signals all over the place. We haven't yet heard whether this syndrome has been a problem for Orcadian VHF and UHF types but we'd imagine it doesn't exactly help. Apparently in Orkney it's been necessary to install an extra TV transmitter near the generator.

MORSE TESTS

The following list shows the dates and locations of all the available test centres from the end of March to the end of April 1987, as we went to press. Because of space limitations, we cannot print a complete list of all the test centres notified to us, but these can be found on the application form itself. If you want to take a test and any of the centres shown is within striking distance, send for an application form immediately. Completed applications will be dealt with strictly on a first-come first-served basis.

Morse tests will be carried out in groups of three and will be of half an hour's duration. Details of the test, the venue and how to get there will he sent to you as soon as your application has been processed and your place confirmed.

COUNTY	TOWN OR LOCATION	DATE
West Midlands	RSGB CONVENTION NEC - (am session)	27/03/87
West Midlands	RSGB CONVENTION NEC - (pm session)	27/03/87
West Midlands	RSGB CONVENTION NEC - (am session)	28/03/87
West Midlands	RSGB CONVENTION NEC - (pm session)	28/03/87
West Midlands	Sandwell	28/03/87
Gwynedd	Bangor	28/03/87
Greater London	Croydon	30/03/87
Guernsey Cl	St Martins	02/04/87
North Yorks	Scarborough	04/04/87
Lancs	Fleetwood	04/04/87
Wilts	Salisbury	04/04/87
Cheshire	Sutton St James, Macclesfield	04/04/87
West Sussex	Horsham	05/04/87
Somerset	Burnham-on-Sea	05/04/87
Derhys	Derby	06/04/87
Gwent	Newport	06/04/87
Cleveland	Billingham	08/04/87
Suffolk	Ipswich	09/04/87
Cambs	Cambridge	10/04/87
Strathclyde	Glasgow	13/04/87
Kent	Dover YMCA ARS	22/04/87
Northants	Tiffield	23/04/87
Notts	Napperley	25/04/87
Leics	Wigston Magna, Leicester	25/04/87
Avon	Redland, Bristol	29/04/87

We receive notification of new centres almost daily and the application form gives a full list of these as far abead as the end of the year, as we went to press.

UK packet satellite gateway

British and American amateurs should be exchanging packets via satellite soon, thanks to UoSAT II - the University of Surrey's experimental satellite.

The go-ahead for this satellite gateway was given to the RSGB as a variation to the GB3UP packet radio relay licence on 30 January by the DTI.

The messages intended for radio amateurs in the USA should he sent to the call-sign of their nearest mailhox, which must be established in advance. All messages originated in the UK will he routed, via the GB station network, to GB3UP for automatic transmission via UoSAT II.

Messages originating in the USA will need to be routed via one of the UoSAT II ground-stations - which at present are located in Washington, Los Angeles and Dallas. Later on, it is expected that UoSAT II may also carrypacket transmissions to Australia, where a fourth overseas UoSAT II ground-station is located. However, a third-party message agreement must take place first.

Provided that packet messages are passed by the licensed GB network in the UK, reciprocal message agreements exist between the UK and USA, Canada and the Falkland Islands. Messages intended for, or originated by, UK amateurs may he passed only hetween amateurs in the countries refered to above.

Council Brief...

High on the agenda for the first Council meeting of 1987 (31 January) was the need for Council to communicate more rapidly with the membership. It was decided that the format of 'Council Proceedings' would change to give members a better perspective of the work of Council & the Society. This 'Council Brief' is a prelude to that longer report, the medium for which would be the Bulletin, because of its short deadline.

The Society's 75th Anniversary year was a major topic for discussion. The election of a rather special President for 1988 and the election of the EVP for 1987 is reported elsewhere in this bulletin. A working party is to be set up to co-ordinate the 1988 celebrations. Council discussed a draft frequency policy plan for use by RSGB delegates and officers. It discussed its plans for progressing its 'Field Operations'.

The performance of the Society during the first quarter of the current financial year was discussed, as was the recruitment of a new Accountant, and annual budgets. The Secretary reported on the progress of the new HQ Manager and described the work being undertaken to improve the response-time of the Membership Services Dept. To illustrate one aspect of the work of the Society, the Secretary had produced a report showing that the Society despatched some 713,000 items into the mail during 1986.

The three-monthly report on publications and a major draft report on attracting newcomers to amateur radio were also circulated.

Under the heading of DTI work, the Secretary discussed the licence review, CEPT licensing, 50 MHz and packet radio. Council also discussed what was and was not practical for the Society to do in respect of advising individual members on how they might solve their EMC problems. A new leaflet on EMC would be published in RadCom in full, as soon as it had been completed. The work of the Morse Test Steering Committee was discussed in connection with the re-appointment of Morse Examiners after the end of June 1987.

Other matters discussed by Council included: the acceptance of members advertisements for certain types of CB equipment, contest winners, club names, a new category for new members over state pensionable age (an announcement will be made shortly), enhancements of the HQ computer system, the chairmanship of the Finance & Staff Committee, historical equipment, the sale of club address labels in the context of electioneering for Council, RSGB representation on BSI Committees, the use of the RSGB Seal, the sponsoring of DXpeditions, Region 1 IARU Conference proxy votes and the admission of the Liechtenstein national society to the IARU.

A more detailed report will follow in a future issue of RadCom.

X-word winners

The gentlemen whose names were on the first three correct Christmas Crossword solutions to be pulled out of the proverbial Headquarters hat are as follows:

1st Prize, £15 RSGB book token:-
Mr C Smith, G0B1W
2nd Prize, £10 RSGB book token:-
D R Mirams, G4SFU
3rd Prize, £5 RSGB book token: -
Des Watson, G3YXO

We didn't have a vast amount of entries for this either, so here's another sort of contest for you. Why not submit a crossword grid of your own to us? If we publish it we'll award you an RSGB book token to the value of £15. Mark it for the attention of the Secretary (Crossword) at RSGB HQ.

RSGB on Prestel

Many members have asked why the Society's PRESTEL pages are in the Micronet closed user-group. The answer - as so often at Potters Bar - is simple; money. By putting our pages in the Micronet CUG, the cost to the Society comes down by something like a factor of 10. Actually, it's a question of cost versus usage. When a high proportion of members make use of the service, we'll be able to consider becomming an "information provider" in our own right. In the meantime, members who are not yet subscribers to Micronet (hint) can still dial Headquarters direct, whistle up their modems and talk to our DataBox - the number is 0707-52242. We now have something like 600 pages of information available, and you can access them 24 hrs a day, 7 days a week.

Operation Raleigh

The Operation Raleigh Hull Amateur Radio Club is located at the Operation Raleigh Support Centre in Hull and is active until the end of the expedition in December 1988, using the callsign GB40RH.

The objects of the club are:
To communicate with the expedition flagship, the Sir Walter Raleigh, GB0SWR/MM/MA.
To communicate with Operation Raleigh projects in the field that are supported by a mobile amateur radio station.
To disseminate information about Operation Raleigh; expeditions, projects and amateur radio activities, and to promote the cause of amateur radio.

GB40RH is operational from 1000 to 1230 on Mondays through to Thursdays on the following frequencies:-

3,650kHz CW
3,732kHz SSB
14.060MHz CW
14.120MHz SSB
21.060MHz CW
21.120MHz SSB
.... when conditions permit.

The flagship has been in Australian waters since December and was planning to leave Fremantle, on the coast of West Australia, after the America's Cup final.
An 'Operation Raleigh' information pack is available by sending a large stamped addressed envelope to:

Operation Raleigh Support Centre
47 Queens Dock Avenue
Hull

Visitors are welcome to visit the exhibition at the centre.

Commonwealth Games Award certificates

Anyone who has not yet received their certificate for the Commonwealth Games Award is asked to contact the tbe organiser, The Lothian Radio Society whose address is:- 601 Ferry Road,
Edinburgh EH4 2TT.

The Mid Lanark ARS's Post Office box - PO Box 20, Motherwell - was used for both stations taking part in the event, and as a clearing house for mail for the Lothians Club.

Events Diary

Mobile Rallies

This is a list of all rallies, exhibitions and conventions notified to HQ (as at press date). Items are given in detail for tbe next three months inclusive and in brief thereafter. Please send detailed information, including contact callsign and telepbone numbers direct to HQ and marked '8ulletin'.

1 MARCH

Welsh Mobile Rally - Leisure Centre, Barry, S.Glam. Details GW8CMU, tel: 0446 711426.

7 MARCH

Tyneside ARS Blue Star Rally - High Gosforth Pk Racecourse, Newcastle-upon-Tyne - 5 miles north of city centre via A1 from north and Tyne tunnel from south. Sponsored by Tbe Newcastle Breweries Ltd. Over 30 trade stands, bring & buy stall, talk-in station, free parking, bar & refreshments, *RSGB stand*. Details G6VEG, tel: Tyneside 2866908 or G4KOT, tel: 2341148.

8 MARCH

Wythall RC Rally - Wythall Pk, Silver Street, Wythall. Spaces are made available at special prices for radio clubs and societies to sell of junk & surplus equipment. Details GOEYO, tel: 021 430 7267.

15 MARCH

South Essex ARS Mobile Rally - The Paddocks Community Centre, Canvey Is, Essex. Details G4FMK, tel: 0268 683805.

25th NARSA Amateur Radio and Electronics Exbibition - Belle Vue, Manchester. 11am - 4pm. 70 trade stands, *RSGB stand*, & 30 club stands. Details G6CGF, tel: 051 630 5790.

20 MARCH

Lagan Valley ARS Annual Hamfest - Grove Activity Centre, Knockmore, Lisburn, Co.Antrim. Opens 7.30pm, talk-in on S22. Details G14TCS, QTHR.

22 MARCH

White Rose Rally - Refectory, University of Leeds. Opens at 11am. Talk-in S22. Details GOEGM, PO Box 73, Leeds, LS1 5AR, tel: 0532 676368 (eve)

Tiverton SWRC Mid-Devon Rally - The Pannier Market, Tiverton. Opens 10am, ample parking and talk-in on S22. Details G4TSW, PO Box 3, Tiverton, Devon EX16 6RS.

27/28 MARCH

RSGB NATIONAL AMATEUR RADIO CONVENTION - National Exbibition Centre, Birmingbam, Hall 3A. Usual amateur radio & component dealers. *RSGB Membersbip services & book stall. RSGB Committee stands* Talk-in & ample parking. Refreshment & bar facilities. Details: RSGB HQ. Trade: Norman Miller, G3MVV (QTHR). See preview, centre pages of this issue.

5 APRIL

Pontefract & DARS Components Fair - Carleton Community Centre, Pontefract. Opens 11am. Bring & buy stall, component dealers, bookstall, refreshments & bar, talk-in on S22. Details GOAAO, tel: 0977 43101.

Cambridge Repeater Group Junk Sale Rally Extravaganza - PRCS (Pye Telecom) Canteen, St Andrew's Rd, Chesterton, Cambridge. Opens 10.30am, auction items booked in from 10am. Junk sale auction, bring & buy, some trade stands. Talk-in by G5P1 on S22 and via GB3PY on RB14. Details G8XMS, tel: 022023 3362.

26 APRIL

RSGB VHF CONVENTION - Sandown Park Race Course, Esher, Surrey. Usual trade stands, comprehensive lecture programme, *RSGB Membership Services & book stall. RSGB Committee stands*. Refreshments and bar. Ample carparking, talk-in. Details VHF Committee.

3rd Radio Rendezvous - Grange Farm Hobbies Centre, Scuntborpe. Details G4ATA, tel: 0724 867137.

Lough Erne Mobile Rally - Killyhevlin Hotel, Enniskillen. Opens 12 noon - more traders - guest speaker GM3HAT - shield and cash prize for best construction project. Details Bill Ward, tel: 0365-24905.

3 MAY

BATC Rally - Crick Post House Hotel, near Rugby. Traders & junk stalls. Not just TV!! Details Trevor, tel: 0532 670115.

Swansea ARS Rally - Patti Pavilion, Swansea. Opens 10.30am. Bring & buy stall, usual traders, lucky programme, full catering. Talk-in S22 by GB2SWR and via GB3WG on RB6. Details GW4HSH, tel: 0792 404422.

4th Anglo-Scottish Rally - Tait Hall, Kelso, Borders. Opens 11am, traders, club stalls, bring and buy, raffles, refreshments & bar. Details Andre, tel: 0573-24664.

4 MAY

Mid-Chesbire ARS Rally - Winsford Civic Hall. Opens 11am, free parking. Details G4XFD QTHR.

10 MAY

Drayton Manor Rally - Drayton Manor Park, Staffs. On A4091, 1 mile from A5 junc. Opens 11am, talk-in on 2m by G1MAR/A and 70cm by G3MAR/A. Details Norman G8BHE, tel: 021-422 9787.

Swindon Rally - Oakfield School, Marlowe Ave, Swindon. Opens 10.30am. Bring & buy stall, usual traders, raffle, attractions for family, ample carparking. Morse tests bookable via RSGB. Details Ken G8SFM, tel: 0666 89-307.

3rd Yeovil QRP Convention - Preston Centre, Yeovil, Somerset. Details Eric G3GC, tel: Yeovil 75533.

17 MAY

30th Nortbern Mobile Rally - Gt.Yorkshire Showground, Harrogate. Usual traders and craft stalls, *RSG8 stand*. Refreshments and bar. Details G3CQQ, tel: 0943 602118.

Cambridge & DARC Rally & car boot sale - Colleridge Community College, Radegund Rd, Cambridge. Opens 10.30am (10am disabled). Trade stands, bring & buy, refreshments. Ample car parking, talk-in S22 by G2XV. Details G4TRO, tel: 0223-353664.

24 MAY

Maidstone Mobile Rally - Maidstone YMCA Sports Centre, Melrose Close, Maidstone. Details G6FZD, tel: 0622 50709.

11th East Suffolk Wireless Revival - Civil Service Sports Ground, Bucklesham, near Ipswich. Opens 10am, free parking, lots for tbe whole family. Details G4IFF, tel: Ipswich 688204.

Plymouth ARC Mobile Rally - Plymstock School, Plymouth. Opens 10am, ample free parking, talk-in S22. Details GOBNT, tel: 0752 777777.

30/31 MAY

Milton Keynes Amateur Radio Exhibition - Bletchley Leisure Centre. Trade stands, refreshments, large free carpark nearby. Details G1GOF, tel: 0234 767904.

31 MAY

Bolton ARC Rally - Dean Sports Complex, New York, Junction Road, Bolton. Trade stands, refreshments & bar. Facilities for disabled and ample carparking. Details Kenneth Wigbtman, tel: 0204-696906.

IN BRIEF - More details later.

14 JUNE

Elvaston Castle Mobile Rally - Elvaston Castle Country Pk, near Derby. Details G4PZY, tel: 0332 767994 or G4CTZ, tel: 0332 799452.

RNARS Mobile Rally - HMS Mercury near Petersfield, Hants. Details G4UJR, tel: 0703 557469.

Mid-Lanark ARS Open Day - Wrangholm Hall Community Centre, Jerviston Street, New Stevenson, Motberwell. Details GM1SSA, tel: Holytown 732403.

Events Diary

19/21 JUNE
Ham Radio '87 - Friedrichshafen, Germany. 100+ international exhibitors at largest amateur radio exhibition in Germany.
21 JUNE
Denby Dale Mobile Rally - Shelley High School, Nr.Huddersfield. Details G3SDY, tel: 0484-602905.
28 JUNE
30th Longleat Rally - Longleat Park, near Warminster. Details G4FRG, tel: Portishead 848140.
12 JULY
Worcester & DARC Droitwich Mobile Rally - High School, Droitwich. Details G0AOC.
17/18/19 JULY
AMSAT UK Colloquium - University of Surrey. Details Ron, G3AAJ, tel: 01-989 6741.
19 JULY
Cornish Mobile Rally - Camborne College of FE. Details G1AJB.
McMichael '87 Rally - Haymill Youth & Community Centre, 112 Burnham Lane, Slough. Details GOBTY, tel: High Wycombe 29868.
26 JULY
Scarborough ARS Rally - The Spa, Scarborough. Details Ian G4UQP, tel: 0723-376847.
2 AUGUST
RSGB MOBILE RALLY - Woburn Abbey, Woburn, Bedfordshire.
Rolls-Royce ARC Mobile Rally - Rolls-Royce Sports & Social Club, Barnoldwick. Details, G4ILG, tel: 0282 812288 or 0282 813271 (day).
9 AUGUST
30th Derby Mobile Rally - Lower Bemrose School, St Albans Road, Derby. Details Martin G3SZJ, tel: 0332 556875.
Hamfest '87 & Craft Fair - Wimbourne, Dorset. Details GOCDY, tel: 0202 872503.
16 AUGUST
Red Rose Rally - Bolton Sports & Exhibition Centre. Details G1IOO, tel: 0204-24104.
6 SEPTEMBER
Preston ARS 20th Annual Rally - Lancaster University. Details G3DWQ, tel: 0772 53810.
13 SEPTEMBER
Lincoln Hamfest - Lincolnshire Showground, Lincoln. Details GBVGF, tel: 0522 25760
Scottish AR Convention - The Magnum Sports & Leisure Centre, Irvine, Ayrsbire.
National Amateur Radio Car Boot Sale - Old Warden Aerodrome, Beds. Details G6EES, tel: 05B2 607623.
SMC Open Day - Chandlers Ford Industrial Est, Eastleigh, Hants.
Telford Mobile Rally - Telford Racquet & Fitness Centre. Details G3UKV.
20 SEPTEMBER
Peterborough R & ES Rally - Wirrina Sports Stadium, Peterborough. Details G4PNW.
Trafford Rally & Components Fair - Lancs CCC (Old Trafford), Talbot Road, Stretford, Manchester. Details G1IJK, tel: 061-748 98D4.
Vange ARS Rally - Nicholas School, Leinster Road, Laindon. Details G4OJN, tel: 02774-4386.
27 SEPTEMBER
Harlow Mobile Rally - Harlow Sports Centre. Details G4KVR, tel: 0279 22365, daytime or G3UEG, tel: 0279 27788, evenings.
4 OCTOBER
Wakefield Mobile Rally - Details G4RCH, tel: 0532 536633.
Great Lumley AR & ES Rally - The Comunity Centre, Great Lumley, Chester-le-Street, County Durham. Details G4MSF, tel: 091 469 3955.
7/8 NOVEMBER
North Wales Radio Rally - Aberconwy Conference Centre, Llandudno, Gwynedd. Details Derrick Watts, tel: Colwyn Bay 530041.
15 NOVEMBER
Bridgend & DARC Rally - Bridgend Recreation Centre, Angel Street, Bridgend, Mid-Glamorgan. Details GW1OUP, tel: 0656 723508.
22 NOVEMBER
West Manchester RC Winter Rally - Pembroke Halls, Walkden. Details G1IOO, tel: 0204-24104.
6 DECEMBER (Provisional)
Verulam Christmas Rally - St Albans City Hall. Details Hilary G4JKS, tel: 0727 5931B.

GB Calls

The list below shows ALL the special event stations licensed for operation during February and March (as at press date). It is taken direct from the GB Calls file on the HQ computer. These callsigns are valid for use from the date given but the period of operation may vary from 1 to 28 days. There's now no need to send details direct to the editorial office.

1 MARCH
GB4EHS - Earlsheaton High School: Dewsbury, West Yorks. Details G4MLW.
4 MARCH
GB6AR - Amateur Radio: Hambleton, Blackpool. Details G4XKR.
6 MARCH
GBDNBL - Newcastle Breweries Ltd: special QSL card to commemorate diamond jubilee of Newcastle Brown Ale. Details G4KOT, tel: Tyneside 2866908.
GB0BSR - Blue Star Rally: talk-in and demonstration station. Special QSL card as per above.
GB2TSW - Training Ship Wizard: Sea Cadet HQ, White Hart Lane, Tottenham,London, N17.
8 MARCH
GB6WR - Wythall Rally. Details GOZYO.
13 MARCH
GB4CNS - Central Newport Scouts: Newport, Isle of Wight. Details G4FYI.
15 MARCH
GB2NRS - Northern Radio Society: Belle Vue, Manchester. Details G4KLT.
21 MARCH
GB2RAM - Ramsey Fairfield: Ramsey, Isle of Man. Details GD4WBY.
GB8PX - PREFIX: Annan, Dumfriesshire, Scotland. Details GM4NNC.
26 MARCH
GB4STD - St.Dunstans' Amateur Radio Soc: Ovingdean, E.Sussex. Details G3SEJ.
27 MARCH
GB0JAG - Jaguar Drivers Club: Silverstone, Northants. Details GOGOF.
28 MARCH
GB2DX - 'DX': Hawkley Hall, Wigan. Details G4NXG.
29 MARCH
GB0SOG - Special Olympics Group: Gt.Yarmouth, Norfolk. Details GOEIL.
30 MARCH
GB8WR - Nunsfield Radio: Spondon, Derby. Details G30CA.
1 APRIL
GB4SG - ST GEORGE: Lancing, W.Sussex. Details G3LQI.

Contests

Listed below are the VHF and HF contests for the next quarter. The full list of RSGB's VHF and HF contests for 1987 was given in the December 1986 issue.

VHF CONTESTS 1987

1 MAR:	70 MHz Cumulative
7/8 MAR:	144/432 MHz & SWL
15 MAR:	70 MHz Cumulative
29 MAR:	70 MHz Cumulative
5 APR:	432 MHz CW
11/12 APR:	70/144 MHz & SWL BARTG VHF/UHF
12 APR:	10 GHz Cumulative
2/3 MAY:	432 MHz - 24 GHz
10 MAY:	10 GHz Cumulative
30 MAY:	432 MHz Trophy & SWL
31 MAY:	1296 MHz Trophy

(cont from previous page)

HF CONTESTS 1987

14/15 MAR:	Commonwealth '50'
21 MAR:	Town & Country
21-23 MAR:	BARTG HF
APR (tba):	ROPOCO 1
19 APR:	QRP Fixed
17 MAY:	Region Round-up

INTERNATIONAL CONTESTS

Organising Society in brackets.

28 FEB/1 MAR:	French Phone (REF) (rules p46 Jan)
7/8 MAR:	Int DX Phone (ARRL)
4/5 APR:	SP DX CW (PZK)
11/12 APR:	Yuri Gagarin CW (RSF)
25/26 APR:	Helvetia (USKA)
9/10 MAY:	CQ M CW/Phone (RSF)
23 MAY:	World Telecom Day CW (LABRE)
24 MAY:	World Telecom Day Phone (LABRE)
30/31 MAY:	Ibero-America Phone (URE)

CLUB CONTESTS

15 MAR: Derby & Dist ARS National 144-145 MHz

Installation address

The installation of the RSGB's 53rd President, Mrs Joan Heathershaw, G4CHH, took place in York on Saturday 31 January.

Just over 150 members and guests, including representative of the DTI, RALU, IBA, BBC and Operation Raleigh attended the installation, which had to be rescheduled following the severe bad weather in mid-January.

In her keynote installation address, the President looked forward eagerly to the Society's 75th Anniversary celebrations, which will take place next year. She stressed that much of the planning would have to be done this year in order to make the celebrations a success and to present a positive picture of amateur radio to the British electronics industry and the public at large. The celebrations would be used as a focal point to promote amateur radio to schools in conjunction with a concerted effort at recruiting newcomers into the hobby. The President said that Britain lacked qualified RF engineers and, along with the DTI, she wished to see amateur radio stimulate a greater interest in this aspect of enginnering; possibly to provide career motivation in young people.

Satellite news

OLYMPUS - a free access satellite?

In 1988 the European Space Agency is planning to launch an experimental satellite, to be named Olympus. Apparently this will have four payloads - one to investigate and verify propagation at 12, 20 and 30 GHz, one 20/30 GHz communications package, one direct broadcasting system and a 12/14 GHz "specialised services payload". An agreement has been reached between ESA and the EUTELSAT organisation (which includes all members of CEPT) which means that "open access" to the satellite will be permitted; it has been suggested that, if national licensing authorities agree, radio amateurs could go temporarily "out-of-band" to carry out advanced telecommunications experiments. In the first instance, anyone who is interested in the idea is invited to drop a line to:

Serge Raes
Universite de Liege
Telecommunications,
Institut Montefiore 8.28,
Sart Tilman,
B-4000 Liege.

OSCAR 10 BACK ON AIR.....

It seems that no sooner do we publish something about OSCAR 10 being on its last legs than some devious footwork persuades the bird to work again. Sticking our necks out that it won't have all changed by the time you read this, the Integrated Housekeeping Unit (IHU) in O-10 was successfully reset on 27 December and, certainly as we went to press, the Mode B transponder was working well. According to its controllers, the sun angle was improving at presstime and, if the IHU memory stays working, the transponder could carry on operating indefinitely. However, the satellite is virtually un-commandable in terms of its configuration and orientation and no attitude changes are possible.

Best advice seems to be to enjoy it whilst you can, especially since the latitude of apogee is approaching the northern hemisphere and some nice DX is appearing. BUT - QRP use is ESSENTIAL - i.e. whatever you do DON'T use more than 100W EIRP and preferably a lot less if you can.

Heard in the House

In reply to a recent Parliamentary question, Peter Bottomley, MP., speaking for the Department of Transport, said that the newly revised edition of the Highway Code will include advice to users of mobile telephones and other radio equipment in the following terms:

> "Do not use a band-held microphone or telepbone hand-set while your vehicle is moving, except in an emergency. You should speak only into a fixed, neck-slung or clipped-on microphone when it would not distract your attention from the road. Do not stop on the hard-shoulder of a motorway to answer or make a call, however urgent."

Mr Bottomley explained that this advice bad been formulated after the views of some 30 interested bodies had been taken into account. Unfortunately, despite its obvious interest in the matter, the RSGB was not consulted. As soon as we became aware of the situation, a letter was sent, via our local MP, to the DoT expressing the Society's concern at the lack of genuine consultation, and pointing out that the Society has published its own Mobile Safety Recommendations for over 30 years. The Society stressed that, despite the world-wide use of mobile amateur radio, it was not aware of any traffic accident resulting from the use of a hand-held microphone. In reply, the Society was advised that the Highway Code is an advisory code of practice only and that failure to observe any of its provisions is not an offence in itself. However, such failure could be used as evidence in any court proceedings which might arise.

The Society's recommendations, which can be found in various RSGB publications, point out that:

> "The transmit/receive switch should be within easy access of the operator and one change-over switch should perform all functions. The microphone should be attached to the vehicle so that it does not impair the vision or movement of the driver. A driver/operator should not use a hand-microphone or double headphone".

Helplines

ACTION - "Take 1":

As part of the Society's dealings with the media, we are always looking for high quality colour and b/w photographs depicting amateur radio at its best. If you have any suitable photographs that you wish to donate to the Society, please send them to "The Secretary" at RSGB HQ.

TV PROFESSIONALS WANTED - "Take 2":

The Society is very conscious of the need to produce some video material for members and the general public. A special advisory group will be formed if sufficient experts offer their assistance. If you are interested, please write to "The Secretary" at RSGB HQ, giving brief details of your skills and experience.

RAYNET:

Vacancies exist on the RAYNET Committee for volunteers to assist in the important task of administering the Radio Amateurs' Emergency Network.

Candidates should be RSGB members, active members of RAYNET and preferably have had some experience of management or control at Group or Zone level.

Meetings are held about six times a year, usually on Saturdays, but also it is probable that the appointment will involve other work, since members of the committee are encouraged to take on the responsibility for overseeing specific aspects of the Network's activities.

RAYNET members interested in serving the organisation in this area are invited to contact the RAYNET Committee Chairman, c/o HQ.

PLANNING ADVISORY COMMITTEE & PANEL

Have you experience in the development control process and planning appeals from either side of the fence?

Have you experience in drafting planning policies, making observations on them or on Government draft proposals for changes in circulars, regulations etc?

Council has reinforced its own organisation to help with this service to members but more volunteers are needed. A member with knowledge of Scottish law and practice would be especially welcome.

If you would like to help, please write to the secretary with a brief note of your experience and indicate if you would be willing to assist members at appeals. It is appreciated that some members who could offer advice may not be able to go to appeals because of restrictions imposed by their employers.

STOLEN EQUIPMENT:

The following equipment was stolen from the QTH of G3YU1 on Wednesday 14 January:-

Trio TS520SE serial No. 1010549
Trio AT200 serial No. 0100472

Any information leading to recovery of these items to G3YU1, QTHR or to Luton Police on 0582-31122.

Also, from a vehicle outside the QTH of G1NRB:-

Yaesu FT290R serial No. 4N400477

Any details please to G1NRE, QTHR.

AMSAT-UK news

AMSAT-UK has recently donated £10,000 to the University of Surrey to assist with the updating of equipment for the amateur satellite command station. This donation has been made without conditions and it's understood that a plaque will be displayed in a prominent position within the University.

It's worth remembering that AMSAT-UK exists purely on donations from its members. Its prime aim is to fund the building and maintenance of amateur satellite for the use of all amateurs.

The "FO-12 Fuji Technical Handbook & Data Sheets" pack is now available from AMSAT-UK. The price for AMSAT members is £2.95, non-AMSAT members will have to pay a little more at £3.50. The handbook & data sheets are in A5 punched loose-leaf format and will fit the existing AMSAT Technical Manual. Additional "Satellite Terminology Updates" are also available at £1.00 for AMSAT members and £1.25 for non-members. Full details of these publications and amateur satellites in general can be obtained from AMSAT-UK, London E12 5EQ on receipt of a large stamped addressed envelope.

Council elects President for 1988

At its first meeting of 1987, held on 31 January, the Society's Council unanimously elected Sir Richard Davies, KCVO, CBE, as President of the RSGB for its 75th Anniversary year.

Sir Richard has a strong background in the electronics industry and is an Extra Eguerry to His Royal Highness the Prince Phillip, Duke of Edinburgh, KG, KT, Patron of the Society. Licensed as G2XM, Sir Richard is an active radio amateur.

Also at the meeting, Mr Frank Hall, GM8BZX, was elected as the Executive Vice-President for 1987. Mr Hall is currently the Zonal member of Council for Scotland.

PME revisited

Not long after we wrote the feature on Protective Multiple Earthing (PME) systems which appeared in last month's Bulletin, we had a few letters asking us where more information about them could be found. Our favourite reference book for anything electrical (as opposed to electronic) which involves consumer-type installations is "Modern Wiring Practice" (9th edition) by W E Steward and J Watkins, published by Newnes. This little paperback contains a mine of interesting information about all the things you wanted to know about the incoming mains supply but didn't dare ask. On pages 76-78 there's a lot of information about PME systems and the rules and regulations pertaining to them, so anyone who wants to know a bit more about it could try there. Alternatively, there's the "Electrical Engineer's Reference Book" edited by M G Say and published by Newnes-Butterworths - your local library should have a copy but be warned; it contains about a million pages and is probably heavier than the EHV transformer in your linear.....

Still on the subject of PME, there was a small typo in last month's article. In the bit of section 1 which dealt with the wire size to be used for bonding, we should of course have said 7/1.35 mm.

Christmas quiz answers

1. Diodes - see "The Restaurant at the end of the Universe", by Douglas Adams.
2. Four bits, according to the computer wizards.
3. 405.
4a. MOULD.
4b. SYsteme LEgere de mesure de DIStance.
5. Green.
6. c.
7. "Ajisai" (see October 1985 Bulletin).
8. 125 degrees plus/minus 3.
9. Our very own Dr John Allaway, G3FKM.
10. The Woodpecker (an HF OTH radar system).
11a. 2121 volts (i.e. 1500 times root 2, which is 1.414 approximately).
11b. About 650 mA (a good rule-of-thumb is 1.3 times the load current, and neglecting it is a good way to blow the capacitor up.....).
11c. Twice the supply frequency, i.e.100 Hz in the UK.
11d. Ten as a minimum - the Vrrm across each leg of the stack will be 4242 volts (i.e. 1500 times twice root 2), which means that if you're using diodes with a Vrrm of 1 kV you'll need five per leg. It'd be sensible practice to use six per leg, actually, which makes a total of twelve in the stack.
11e. One equalising resistor and one equalising capacitor - to equalise the Vrrm and any transient voltages across each diode respectively.
11f. 5.782 kW ERP.
11g. Most BNC connectors we've come across are rated at 500V dc or peak ac. A 300N amplifier working into a 50 ohm load implies a peak voltage of around 173 volts, so no problems there, but a BNC isn't as mechanically reliable as something like an N-type. Also, you'd probably want to use something like UR67 or RG-8U for your coax and a normal BNC won't fit. Moral - use an N-type (or an SO-239 if you really must).
12. Cellnet and Vodafone.
13. 21 October 1929.
14. The Gunn diode.
15a. They are all Civil Aviation Authority/National Air Traffic Services radar sites.
15b. 1 296 MHz (23 cm).
16. Germanium (groan).
17a. Hidetsugu.
17b. Carl.
18. Frequence d'Optimum Travail (i.e. Optimum Working Frequency).
19. a) 74-series TTL b) Advanced Low-power Schottky.
20. a) negative b) TO220 c) input (yes, we often forget that too - it isn't the common, as it is on the 78 series).
21a. Diode AC Switch (handy for triggering triacs).
21b. Electronic Numerical Integrator And Calculator (an early American computer).
21c. Silicon Controlled Rectifier, also known as a thyristor.
21d. Root Mean Square.
21e. Effective Isotropic(ally) Radiated Power.
22. G - conductance.
23. Gallium and arsenic.
24. Radio Investigation Service (no marks if you said Interference).
25. Electronic Random Number Indicating Equipment.
26. Lytham St Annes
27. It's a triode-hexode, usually used as a frequency-changer in a superhet in the good old days before FETs, diode rings and whatnot.
28. Good question! /M is the correct answer.
29. Sporadic E.
30. 8.5 dBd approx.
31a. 671.25 MHz.
31b. Band V.
32. 50.050 MHz.
33. 10 368.25 MHz. Double points if you said it wasn't yet operational though!
34. Not unless you want a small fireworks display - this resistor series has a maximum rating of 250V.
35. 2,000V - much more and it's Big Flashover time.
36. 35V.
37. 600V.
38. Around 2V.
39. In the UK, 240V plus or minus 6% (unless your callsign is GW4FRX, where it's frequently plus or minus 10%.....).
40. EN6 3JE.
41. SE1 8UA.
42. S49 1PF.
43. Top Band (1.8 MHz) - it's Cullercoats Radio.
44. 7 MHz most of the time, 14 MHz sometimes.
45. Enver Hoxha.
46. King Talal, deposed 1952. King Hussein succeeded him in May 1953.
47. VU2RG.
48. K7UGA.
49. Connect International.
50. Ian Nade, G3NRW.

If there are any winners (chance would be a fine thing) we'll announce their names next month!

PS

Verulam ARC announces that this year's G3PAO Memorial Lecture will be held at 7.45pm on Tuesday 24 March at the RAFA HQ, New Kent Rd, St Albans. The lecture will be entitled "Antennas for the Small Garden" by Don Field, G3XTT. Visitors welcome and details from G4JKS on St.Albans 59318.

The Collins Owners' Club has been in existence for four years. It's supported by owners of pre-Rockwell, Collins Radio Co equipment. Details of the club can be obtained from G4KSG, QTHR.

We've just heard that DARC, the German national amateur radio society, will be attending this year's NEC and will have a stand next to the RSGB's.

The new Spring 1987 edition of the Amateur Radio Callbook is scheduled to be on sale at the NEC. It will carry the most up-to-date listings of UK and Eire radio amateurs as well as the updated "Members' Handbook". So come along to the stand with your 'flexible friend', cash or what have you, and take away a virgin copy!

NEWS & VIEWS

HF

*John Allaway, G3FKM**

MENTION OF THE FACT, in the January *HF*, that G4WCO had received QSL cards made out to his callsign and intended for someone called Trevor in Hatfield, brought forward a rather strong response from Trevor, G4WKJ, and from G0AMG, both of whom have Hatfield addresses. It seems that the answer may well be that G4WKJ's callsign when rearranged slightly can be read as G4WCO. In any case it might be remembered that it was *G4WCO* who thought that *his* call was being misused, and of course it is still not impossible that it is! Any inconvenience to G4WKJ is regretted.

HF beacons

At the beginning of 1987 we could be coming to the end of an era in the hf beacon field. In nearly 20 years the 28MHz beacon network—the International Beacon Project (IBP)—has gradually grown to its present scale, mainly through the efforts of a small band of dedicated amateurs, in many cases working on their own without the support of a club or society. We should be grateful for their efforts. Now a new look project is in sight.

In 1984 the Administrative Council (AC) of the International Amateur Radio Union (IARU) placed the IBP on its agenda, considering that IARU bandplans allowing beacons 100kHz between 28·2 and 28·3MHz gave too much spectrum space to the project in the face of the pressure on the amateur service from other users of radio communications and the number of amateurs now being licensed. It seems that they thought that a single-frequency time-sharing system on the lines of the 14MHz Northern California DX Federation (NCDXF) one would be adequate. Strong reaction from the IARU Region 1 Division (Europe, Africa, the Middle-East, and the USSR) caused the AC to think again and in November 1985 the AC produced a scheme suggesting that one worldwide and a number of regional time-sharing networks would meet the need. Further representations were made by the Region 1 IARU IBP Coordinator pointing out that some continuous duty stations were needed for serious study of propagation phenomena, an activity in which amateurs in Region 1 have been prominent. This second approach has resulted in a new AC resolution recommending an allocation as follows:

28·190–28·199MHz = Regional networks, each approximating to a continent, to be time sharing and spaced on integral kilohertz.
28·200MHz = A world-wide time-sharing network.
28·201–28·225MHz = Continuous duty stations to be established on a case-by-case basis as submitted to the International Co-ordinator (IC).

The AC also recommended that the IARU bandplan protection of the present 28·2–28·3MHz segment should be withdrawn on 1 January 1990.

An expansion of the IBP to the 21MHz band is to be undertaken. After consideration by the HF Working Group, Region 1 has chosen a frequency of 21·15MHz for a time-shared network.

The NCDXF network on 14·1MHz continues its most useful service. It may be increased to a total of 15 stations to give greater geographical coverage.

All this presages a major update of the 28MHz beacon system to bring it into line with the present and future requirements, both technical and operational. Unfortunately, there is at the moment an external action which may negate some of the value of the network. It concerns a petition of the American Radio Relay League (ARRL) to the US Federal Communications Commission (FCC) for enhancement of the US Novice (and Technician) licensee privileges, which coincided with the IARU discussions reported above. This requested, *inter alia*, use of digital communications (A1A, rtty, and packet radio) between 28·1 and 28·3MHz and J3E between 28·3 and 28·5MHz in lieu of their existing use of A1A only between 28·1 and 28·2MHz. It can readily be seen that, with the soon to be hoped for increase in sunspot activity coupled with a large number of novice and technician operators, the interference to beacons could be considerable. At the time of writing the FCC's decision on its notice of proposed rule making (nprm) is awaited. In the event that the FCC grants the additional privileges to the American operators, the ARRL has given an assurance that it will request members to avoid operation in the beacon-frequency segment.

More news on the developments outlined above will be given from time to time on RSGB Databox and Prestel pages, and in this column.

Amateur radio equipment donations

In an interesting letter to the Society, the secretary of the Radio Society of Zambia says that the Posts & Telecommunications Corporation has advised RSZ that it may receive donations of amateur equipment from clubs, societies, or any other donor through them. No tax or duty will be imposed on such items. Almost anything (including vhf gear for the novice licensees who are expected to be licensed soon) is welcome. The contact address is: The Chief Radio Officer, PTC Telecoms Headquarters, PO Box 71660, Ndola, Zambia. (This is a very worthwhile project because new equipment is virtually unobtainable in Zambia and this is causing the number of 9J2s to decrease).

Peter I Island

With luck, by the time that this reaches readers a brand new DXCC country will have been on the air. The island was to be visited by two members of the LA DX Group, Kare, LA2GV and Einar, LA1EE. The operation became possible when it was known that the Norwegian Polar Institute, a government agency, was organizing a mapping and research expedition to the island.

LA5HE has kindly supplied a translation from the Oslo newspaper "*Arbeiderbladet*" of 24 December 86. It says "Peter I Is is to be properly mapped and an automatic weather station is to be placed on this Norwegian territory in the Antarctic. The Norwegian Polar Institute has chartered the ship M/S *Aurora* for 38 days in January and February. On January 10 a party of seven is boarding the *Aurora*, which in the meantime has transported the geologist Monica Kristensen to the Bay of Whales (She is re-enacting the Roald Amundsen expedition of 75 years ago and at the time of writing is underway with dog sledges towards the South Pole -*LA5HE*). The voyage from New Zealand to the island is estimated to take 14 days and the actual Antarctic mission will take 10 days and the return voyage goes via Ushuaia. When the government decided to allocate funds for this expedition, it was for the purpose of having proper maps of the area made. Peter I Is has been Norwegian territory since 1931 but there is no map available of the island which is about 20km long and 10km wide. Most of it is covered by ice and snow. The NPI expedition's mission is to determine exactly the position of the island, carry out geological measurements and take photographs from the helicopter. The goal is to have the same standard map available as the ones NPI now has for Bouvet Is. The island is to be equipped with an automatic weather station at a cost of NOK 120,000. The island is strategically located to provide important meteorological data for better weather forecasts in the southern hemisphere. This will be the second Norwegian weather station providing data for the international community —the first being the one on Bouvet Is. The estimated cost of the expedition is NOK 2·5 million, and the leader is Knut Svendsen (topographer) who will be accompanied by marine biologists and two radio amateurs who are paying their way as members of the team".

The LA-DX Group needs your contributions to cover the expenses, and in the UK these may be sent to *DX News Sheet*.

Mark Taylor, G1WEY (14 years), is seen here having a personal exchange of QSL cards with Jean-Robert Gaillard, HH2JR some four weeks after his first ever hf contact while using his father's call G4GKZ.

*10 Knightlow Road, Birmingham B17 8QB

QTH CORNER

C56/W1NX	via JA1LFR, K Kokobun, 4-22-6, Higiriyama, Kounan, Yokohama 233 Japan.
D68QL	(see S79KG)
FH/W6KG	(see S79KG)
KL7Y	D Robbins, Box 873271, Wasilla, Alaska, 99687, USA.
S79KG	YASME Foundation, PO Box 2025, Castro Valley, Cal, 94546, USA.
S79LJ	via G4LJF, T H Shepherd, Huls Farm, Blagrove Lane, Wokingham Berks RG11 1NY.
TI9W	via TI2KD, Box 523, San Pedro, San Jose 2050, Costa Rica.
VK0DA, VK0GC	via HIDXA, PO Box 90, Norfolk Is, Australia 2899.
VP8s HZ, NX, VK, PTG	via G4RFV, B Adams, 38 Waterloo Rd, Poole, Dorset BH17 7LF
ZB40ANV	ZB2BU, PO Box 292, Gibraltar.
3Y1EE, 3Y2GV	via LA6VM, Jacob Faves vei 6,0827 Oslo 2, Norway.

General news

Amateurs in Singapore were permitted to use the 10, 18, and 24MHz bands from 1 January 1987. They will have secondary status and must therefore not cause interference to the primary service using the bands.

G3EZZ has drawn attention to the fact that when submitting a ZC4 QSL for credit for the British Sovereign base in Cyprus any existing ZC4 credit for Cyprus is automatically deleted—regardless of the date of the QSO and a resubmission for Republic of Cyprus credit is required.

Very good news has been received from Belgium where amateur radio seemed to be in some danger of losing a lot of privileges and even bands. A letter from Rene Vanmeirsen, ON4VY, Honorary President of UBA, says that Class B (ie full) licence holders may now use 10W in the section 1·83–1·85MHz on a secondary basis and that this will become primary in due course. In the same way 18 and 24MHz are available on a secondary basis with all normal modes. Power levels on all hf bands are 150W (including 18 and 24MHz). There is also a Class A beginners licence (simplified examination and no morse test) which permits 15W of phone between 144 and 146MHz, and a Class C which allows the use of many modes on the bands above 30MHz. This is issued to those passing the full examination but has no morse requirements.

From the VK1 QSL manager comes the news of a large number of cards arriving for VK1 calls which have not been issued. Particular offenders are VK1s A,B,C,D,E,F,AA,QAV, and GDW. All QSOs made by these have been on cw. VN1A, VN1B etc, have also been active. There are no Australian calls with a single letter suffix and VK1AA is an official government callsign. Any information would be welcomed by John Clare, VK1CJ, GPO Box 600, Canberra ACT 2601, Australia.

DX news

John Layton, G4AAL, advises that at the beginning of January he was still waiting for a second batch of QSL cards to be delivered for contacts made during the Operation Raleigh Pacific crossing. A number of local amateurs are standing by to help when the cards arrive and all cards received will be answered.

4K0D was a special call used by the Russian drifting station UPOL 28 in the Arctic and celebrated the 50th anniversary of the first Soviet polar expedition by Ivan Papanin. 4K1A is active from Molodezhnaya base and 4K1C from Vostok. It is believed that KC4AAE has been operated from Vostok during an exchange visit.

5A0A appears to be in **Libya** and is being operated by SP6RI. He is a teacher at Benghazi University and operates his radio for the purpose of "investigation into ionospheric radio-wave propagation". He seems to be confined to 14,005 or 21,005kHz mostly between 0900 and 1100. *DX-NL* says that he is not allowed to answer questions or operate split-frequency. At the time of writing 5A0A QSLs were not being accepted by the DXCC desk.

FR/G/FH4ED is on the air from **Glorioso Is** and seems to favour French speaking nets. He sometimes may be found near 14,060 or 14,125kHz at 1500. FT8WA on **Crozet Is** is sometimes to be found near 21,008kHz or 14,030kHz after 1300, and FT8ZA on **Amsterdam Is** has been worked on the low end of 14MHz on cw around 1600. It is understood that stations on **Marion Is**, which used to use the ZS2M prefix, will be ZS8s in future but there is no amateur operator on the island at present. Stations in the **S African Antarctic** area will use the ZS7 prefix (eg ZS7ANT). Since 15 December last **Japanese** stations have been allowed to use 3,791–3,805kHz. Their band on 1·8MHz is 1,907·5–1,912kHz and regular domestic users of this area are asked to try to avoid it during times when there may be propagation to Japan.

The number of active amateurs in **The Gambia** seems to be decreasing. Melinda, formerly C53EU, is in Lesotho at present and has the callsign 7P8DN. Readers should note that anything sent to his Banjul address will not reach RSTG. **Long Island DX Bulletin** says that C53FJ joins the W7PHO net on 14,227kHz from 2100 and that C53FH operates independently at the same time near 14,239kHz.

KN4BPL/KH3 is the commanding officer of the **Johnson Is** coastguard station. He will make schedules on any band and has been worked in the UK on 7,084kHz just before 0900. KL7LF/KH3 is active on the higher frequencies every day and is a participant in the W7PHO family net on 14,226kHz from 2000.

Plans for the **Mellish Reef** operation (VK9MW) are going well and a boat has been rented in Cairns at a cost of A$15,000 a week. The trip should take place in August and cw operators are needed—anyone interested please contact K4ADN.

A61AB is on most days and has been found on 7,043 and 24,250kHz between 2200 and 0600.

K8JRK and some other W8s will operate as FO0SSJ between 26 March and 6 April. They will be on all bands/modes from the island of **Bora** from the home of FO5JP. During the CQWW WPX Contest they will be very active.

Another WPX contest special will be that by 4X6TT who hopes to be on the air from **Cyprus** with an HT0 prefix from 20 to 31 March.

Richard, G3CWI (ex-VP8ANT etc), should be in **Brunei** now and hopes to be on the air with a V85 call. If he is, his QSL cards will be dealt with by G3ZAY.

On 29 March, in **Monaco**, the association AMADE will organize a National Day for Children. Association des Radio-Amateurs de Monaco (ARM) will be on the air for this operation with the special callsign 3A7A. The president of AMADE is His Highness Prince Albert of Monaco, and the organization was founded in 1964 by Her Highness Princess Grace.

Welcome

To the following who became members of the Society during December: DJ4ZE, EI2CRB, EI5CSB, HB9CJG, K6WE, LA8SJ, N4OGH, ON7ZO, VE7HAM, ZD8MAC, and 9N1MC.

Contests

In the December column under the results of the **1986 ARRL DX Contests** (Phone section) G4BWP, G4XKR, G4XOM, and GM42WEW should have been listed as single-band 14MHz entries.

SP DX Contest
1500 4 April to 2400 5 April
CW only, 1·8 to 28MHz. Exchanges consist of RST and serial number (from 001). Polish stations will send RST and two letters to indicate their province. Each QSO counts three points and the multiplier is the number of different provinces (powiats) worked—each counts once only. There are single-operator single and multi-band, multi-operator multi-band, and listener sections. Post logs before 30 April to PZK, SP DX Contest Committee, PO Box 320,00-950 Warszawa, Poland.

CQ WW WPX SSB Contest
0000 28 March to 2400 29 March
1·8 to 28MHz. QSOs with own continent count two points on 14, 21, and 28MHz, and four on 1·8, 3·5, and 7MHz. With other continents three and six points respectively. Own country may only be worked for multiplier credits and no points are gained. The multiplier is the total number of different prefixes worked—each counts once only. Exchange RS and serial QSO number (from 001). There are single-operator single and multi-band and multi-operator multi-band single-transmitter categories. The last must have one transmitter only, and stay on a band for at least 10min at a time and changing band to work a multiplier is not allowed in this time. There is a QRP section for stations running no more than 5W output and entries in this category must be clearly marked "QRP". Single-operator entrants may only operate for a maximum of 30h and they may take up to five rest periods which must be clearly marked in the log. To qualify for an award single-operator entrants must operate for a minimum of 12h (this is 24h for multi-operators). Score is total QSO points times multiplier. Logs must show date, time, station worked, numbers sent and received, if new prefix, and points claimed. A prefix check list must be enclosed. Entries must be postmarked no later than 10 May 1987 and sent to CQ Magazine, WPX Contest, 76 N Broadway, Hicksville, NY, 11801 USA. Photocopies of rules are available from G3FKM (sase please), and log and summary sheets are available from CQ.

UBA Spring Contest
1 March 0700 – 1100 (3·5 and 7MHz ssb)
15 March 0700 – 1100 (3·5 and 7MHz cw)
Copies of rules are available from G3FKM.

1986 ALL-BAND TABLE No 6

Callsign	1·8MHz	3·5MHz	7MHz	14MHz	21MHz	28MHz	Total
G4OBK	70	77	96	118	122	74	557
G4WXO	14	51	81	190	149	55	540
GM3YOR	55	89	111	58	59	35	407 (all cw)
GW4RHW	–	42	122	139	55	40	398
G3TXF	48	51	67	132	53	26	375 (all cw)
GW4OFO	13	141	109	97	5	9	374
G4OTU	27	44	72	96	77	36	352 (all cw)
G4ODV	47	43	71	76	80	34	351
G4GOF	4	10	28	54	47	35	178

Next deadline 8 March 1987. This will be for the first 1987 table. Entries to G3GIQ please.

ALL TIME TABLE WITH DELETIONS No 13
(Table serial NO 19)

Callsign	1-8MHz	3-5MHz	7MHz	14MHz	21MHz	28MHz	Total	
G3KMA	125	236	306	332	333	318	1650	
G3GIQ	70	205	254	334	332	310	1505	
G3MCS	49	209	258	321	322	306	1465	
G3XTT	140	194	235	284	279	247	1379	
G3UML	31	220	234	334	298	255	1372	
G4DYO	64	177	227	312	303	286	1369	
G3HTA	69	182	233	311	291	249	1335	
G2DMR	54	171	185	308	309	266	1293	
G3ALI	2	211	220	315	276	235	1261	
G4FAM	63	180	238	268	268	242	1259	
G4GIR	71	172	210	273	257	246	1229	
VK9NS	80	184	226	290	243	192	1215	
G3XOU	47	168	184	291	271	242	1203	
G4BWP	71	186	211	268	222	240	1198	
GW4BLE	25	171	183	282	270	245	1176	
G4LJF	29	193	217	282	247	203	1171	
G3VIE	41	109	160	290	287	252	1139	
G3TXF	62	163	183	260	252	211	1131	
G3NOF	4	85	82	343	324	278	1116	
G3YMC	78	104	167	238	239	184	1010	
GM3YOR	72	134	176	211	196	180	969	(all cw)
GW4OFO	60	198	181	209	191	135	964	
G4OBK	118	109	138	195	169	137	864	
GM3PPE	59	137	152	188	168	140	844	
Average	61	171	202	281	265	233	1213	

Next deadline-current all-time- to reach G3GIQ by 9 April. (Band leaders are listed in bold type).

FINAL 1986 28MHz TABLE

G3VOF	— 119	G4MUW/M	— 74(ssb)	G3BXM	— 31
G4JBR	— 117	G4OBK	— 74	GD3SUW/A	— 27(cw)
G0AEV	— 114	G0DNV	— 71	G4NXG/M	— 21
G3XQU	— 113	G4DXW	— 44	G4YWG	— 17
G4XAH	— 94	GM4CHX	— 33	G4LZZ	— 5
G0AGP	— 88	4X4FL	— 32	5B4DN	— 2
G4RAB	— 74				

Congratulations to G3VOF. The first 1987 table will appear next month.

Awards

160 Metre Worked All Zones

The rules for this are essentially the same as for the normal WAZ Award. However, only contacts on or after 1 January 1975 count. However, applicants may apply at a 30 zones "Plateau" for the basic award. Only "mixed" category is issued. Applications should be made on *CQ* form 1479 (copies of which are available from G3FKM) which must be sent together with the QSL cards to W4KA, Leo Haijsman, 1044 SE 43 Street, Cape Coral, Fla, 33904, USA. The fee is US$5.00 and US$2.50 should also be enclosed for the safe return of the QSLs. Stickers for 35,36,37,38,39, and 40 zones may be obtained by sending the additional cards and US$2.00 per sticker—again, all applications must be sent direct to W4KA.

Worked All Zones

CQ has clarified the position of stations in China by indicating that all stations in the call areas BY1-BY9 are in Zone 24 and all BY0s are in Zone 23.

The multi-band version requires QSOs from 15 November 1945 either on mixed modes, two way ssb, all phone (ssb and phone mixed), or all cw. Single band all cw and all ssb certificates are available and require QSOs with all 40 *CQ* zones since 1 January 1973. All applications should be made on the official form 1479 (available from G3FKM—sese please), and completed forms plus QSLs may be sent to G3FKM who will certify that the list is correct. The form only should then be sent to W4KA, together with US$10 (unless the applicant is a *CQ* subscriber in which case the fee is only US$4.00). Note that QSOs with mobile stations do not count, nor do contacts made on 10,18, or 24MHz.

Border Award

For contacts made with stations in counties on the Welsh-English border on or after 1 January 1987. These are Clwyd, Powys, Gwent, Cheshire, Shropshire Hereford/Worcester and Gloucestershire. Work/hear either an Oswestry & District ARC member or the club station G4TTO plus (for UK and Eire) 10 stations in each county of (for others) five. Send list of log entries, certified by two other amateurs or listeners giving date, time, frequency, mode, and county, together with £1.75 or 10ircs to: Tony, Awards Manager, PO Box 6, Oswestry, Shropshire, SY11 1ZZ.

The ***International Awards Guide*** consists of 434 pages describing 1027 awards. It has 371 illustrations and 116 lists of valid stations, countries,

HF F-layer propagation predictions for March 1987

The time is presented vertically at two-hour intervals 00(00)gmt to 22(00)gmt for each band, ie ⅔ = 0000, ⅔ = 0200, ⅔ = 0400 etc.
The probability of signals being heard is given on a 0 (indicated by a dot) to a 9 scale; the higher the number the greater the probability, with 1 meaning 10 to 19 per cent of days, and so on. Additionally 50MHz F-layer and 1·8MHz openings are indicated by a plus (+) sign in the 28 and 3·5MHz columns respectively.

Time / / GMT	28MHz 000001111122 024680246802	24MHz 000001111122 024680246802	21MHz 000001111122 024680246802	18MHz 000001111122 024680246802	14MHz 000001111122 024680246802	10MHz 000001111122 024680246802	7MHz 000001111122 024680246802	3.5MHz 000001111122 024680246802
** EUROPE								
MOSCOW	.....	.....	....11221...	....344531..	...3677775..	..1655556841	655422224687	++3.....3++
MALTA	.....	.....	....12232|..	....455553..	...27777872.	221665567883	007532234680	+++2.....4++
GIBRALTAR	.....	.....	.....1111..	....123333..	....5666772.	.1.276666881	676753334687	+++42....3++
ICELAND	.....	.....	.....	......111...	.....24554..	....4666676.	32.353334675	+++42....34+
** ASIA								
OSAKA	.....	.....	.....	....12.....	...14431....	...14222241.	....1...145.	.....3.
HONGKONG	.....	.....	....122.....	....3441....	...1555312..	....2222361.	1463	242
BANGKOK	.....	....11.....	....2332....	...14554....	...1555511..	12223521	2.....1576	244
SINGAPORE	.....	....1111....	....23341...	...145554...	...2355563..	|....2224631	2.....1576	244
NEW DELHI	.....	....1111....	....3334....	...24556....	...234553...	1.1..1224332	62.....1477	4.....24+
TEHERAN	.....	....1212....	...144452...	...355665...	...4335564..	413211224744	852.....1570	+3.....24+
COLOMBO	.....	....1212....	...134453...	...2456651..	...2235565..	.1....1224754	41.....1578	3.....24+
BAHRAIN	.....111....	....22231...	...144553...	...355675...	...4335563..	5231..224655	862.....1478	+3.....24+
CYPRUS	....11111...	....23332...	...1566651..	...4777674..	1.1766668831	755533345887	985211113589	++2.....2++
ADEN	....11221...	....23342...	...1456751..	...3455773..	1..322356721	7221...24776	862.....1478	+4.....24+
** OCEANIA								
SUVA/S	.....	.....	.....	......11....	.....23312..	...12222351.	...21...14..	.....
SUVA/L	.....	....1.....1.	....3.....3.	...15211.25.	..154211163.	...31...14..	.....
WELLINGTON/S	.....	.....	.....	.....111....	....234431..	....2322245..	...21...141.	.....
WELLINGTON/L	.....	.....	.....	.....1.	....3.....4.	.11341...331	...21....31.	.....
SYDNEY/S	.....	.....	....12.....	...144211...	...3654332..	...23222461.	....1....153.	.....2..
SYDNEY/L	.....	.....	.....	....1.....	....42....4.	....421...52	....1....23.	.....
PERTH	.....	....121.....	...1444.....	...26662....	...3555433..	1..122224652	1.....1574	242
HONOLULU	.....	.....	.....	.....	........13..	....1111231.	...21....11..	...2.....
** AFRICA								
SEYCHELLES	....11221...	....23342...	...1456751..	...2456773..	1..222456721	732...124776	851.....1478	+2.....24+
MAURITIUS	....12231...	....34453...	...1557761..	...3557774..	1..322456731	7411..124786	841.....1478	+2.....4+
NAIROBI	....12342...	....34564...	...1556872..	...2555785..	11.422256831	7622...24786	883.....1478	++.....4+
HARARE	....12453...	....34675...	....566884...	....23557871.	11.432256851	7722...24787	884.....1478	++.....4+
CAPETOWN	.....25641...	.....247773...	....467886...	....6667882.	1..343346871	75341..13687	8851....1478	++2.....4+
LAGOS	.....25651...	.....246773...	....566787...	....6556883.	12.253235871	68152...3686	8963....478	5+5.....4+
ASCENSION Is	.....11242...	....133364...	....3655771.	....6655684.	.2..63223681	475241...486	88841....168	+++2.....3+
DAKAR	.....13332...	.....33554...	....2566771.	....5655684.	.11.6432468.	376341..1486	88851....158	+5+2.....2+
LAS PALMAS	......1111..	.....22233...	....2555661.	....5777783.	.1.177667881	476564334686	899631111379	+++3.....4+
** S. AMERICA								
Sth SHETLAND	......1122..	......2344..	......56771.	.....266774.	.11.2445566.	376432122344	57851.....13	3452.....
FALKLAND Is	......2232..	......4454..	.....267771.	.....477674.	.11.2544456.	3663421112 34	78851.....14	4++2.....
R DE JANEIRO	.....1122..	.....23234...	.....554561.	.....664564.	.11..5422461	3663221..145	88841.....16	+++2.....3
BUENOS AIRES	......1122..	.....13334...	.....355562.	.....565564.	..1..5533351	2662322..134	78851.....4	5++2.....
LIMA	.....1..	.....1112..	......32341.	......54443.	532231	13412121..13	58841.....1	3++2.....
BOGOTA	.....	.....11..	......22231.	.....43342.	1432231	222.3221..13	68732.....2	4++2.....
** N. AMERICA								
BARBADOS	.....1..	......1.12..	.....132341.	.....353453.	3522351	2331222...25	78741.....4	++52.....
JAMAICA	.....	.....1..	......11231.	......33342.	443331	111.1121..13	57731.....1	3++2.....
BERMUDA	.....	.....1..	......11231.	......33342.	2433451	211..221.134	67621.....3	5++2.....
NEW YORK	.....	.....	.....112..	......13341.	.....34344.	11...2221123	56411.....2	3++2.....
MEXICO	.....	.....	.....112..	.....3331.	.....14322.	11..1.221..1	25411.....	.4+2.....
MONTREAL	.....	.....	.....111..	.....12231.	.....34344.	1....2221233	56411.....2	3++2.....
DENVER	.....	.....	.....	.....11..	.....2432.	122111	24211.....	.3+2.....
LOS ANGELES	.....	.....	.....	.....11..	.....1431.	.....231..	12111....1...	.252.....
VANCOUVER	.....	.....	.....	.....	.....121.	13211	1211....1...	..42.....
FAIRBANKS	.....	.....	.....	.....	.....1..	....1.11232.	...21...1211	...2.....

The provisional mean sunspot number December 1986 issued by the Sunspot Index Data Centre, Brussels, was 6·4. The maximum daily sunspot number was 24 on 13, 14 December, and the minimum was 0 on 1-8, 15, 18-20 and 26-31 December. The predicted smoothed sunspot numbers for March, April, May and June 1987, are respectively: (classical method), 15, 16, 17 and 18; (SIDC adjusted values) 17, 18, 19 and 20.

cities, etc. It is produced by Radio Club Ypres, PO Box 32.B-8900 Lepel, Belgium, and costs US$34 or 58IICs. International money orders and cheques are accepted and should be made out to the club secretary Chris Vermota.

Band reports

Back to normal this month in spite of the blizzards. G8KG has produced his first report for 1987 which reads as follows: "With the solar data for December not available at the time of writing it is not possible to say whether or not the marked build-up in solar activity in October and November heralded the beginning of Cycle 22. The build-up was certainly of considerable interest and will be discussed in a later paragraph, but the writer is inclined to think that it was only a typical upsurge lasting two or three months of the type which frequently occurs during the decline of a solar cycle. It could be that the start of the new cycle is imminent but readers would be well advised not to be too optimistic just yet. Band conditions in recent weeks tend to confirm that the recent upsurge is over, and as mentioned in past reports, there are reasons, albeit somewhat tenuous, for thinking that the minimum will not arrive until late this year or early in 1988.

The "vital statistics" of the October/November event were interesting though by no means unparalleled. From September to October the monthly sunspot number leapt from 3·9 to 35·7 before falling to 14·7 in November. As reported earlier, the highest activity coincided with the CQWW Phone contest with sunspot numbers above 70 on 24 and 25 October (peak solar flux 99sfu on 23 October) while the geomagnetic field was quiet for several days. After about four months of hovering around the 70 mark and the 27 day average of solar flux rose steadily during much of October and peaked at 87sfu but then fell away steadily during November (and December figures are expected to show a continuing decline). Despite this fall there were a number of good days on the higher bands during November and the end of the month saw 28MHz open to all continents except, perhaps, Oceania despite very low sunspot activity. During December and early January, however, the signs were that the effects of the upsurge were over. Only time will tell for how long".

This month most regular correspondents have been able to get their reports to me in time again and I am very grateful to G5JL, GM3CFS, GM3CSM, G3s GVV, KSH, PJT, G4JBR, GW4KGR, G4s LRS, MUW, NXG/M, OBK, UZN, XAH, G0s AEV, AGP, and RSs 10906, 52868, 87259, and 88639, for sending them.

Callsigns printed in italics were of stations using A1A.

1·8MHz 0300 *VE2EOL/2* (Zone 2). 0500 *LU5WP*. 0600 CT1AQZ, *VE1ASJ, W1,2,3,4,8,9*. 0700 *KL7Y, ON4UN,W1,2,3,8*. 0800 *KA8YGL, VE1BVL, W4*. 2300 *K5NA, ON5NT, W9AZ*.

3·5MHz 0100 *P40R, RI8BQ, UA0ALQ, VP2MU*. 0200 *PJ2LS, ZS5MY*. 0300 *FY5YE*. 0400 HI8RKM, *SV1RX/SV7, VP5X*, VP9TAE, J6LAN/9Y. 0500 *TI4SU, VE2EDK/VE2*, YN3EQ, *6W1PS*. 0600 *VE7EYF, VP2VA, W6-7*, 0700 *K6NA, N6ND, 5T5XX*. 0800 C6ANX, JA7NX, YN3EO. 1600 JA1NRH. 1700 KH0AC. 1800 EA9IE, JA5BJC, VE8HL, ZL4BQ, ZS3Z. 1900 VE8HL, VK2AVA, YB, YC0KM. 2000 JH1DHI, KH0AC, VE8HL, YC0BAQ. 2100 J79MD, S79LJ, VE8RCS, 16CZW/4S7. 2200 HH7PV, JA6IEM, *TP2CE*, VQ9YR. 2300 *FY4EE*, K1DQV/KP4, TI5EWL, *UV100, VQ9QM*.

7MHz 0000 *TA1C, VK2LA, VP2MDY*. 0100 *J6LAD/9Y*. 0200 VP2VM. 0600 *CE2HHJ, CM, XE2VB, YN3EQ*. 0800 *JAs, WL7E*. 0900 *CO4RCB, JAs, NR7E, ZL4IN*. 1000 *JH1DTC, UV1OO, VE2EOK/2*. 1500 *W6s, 9N5YDY*. 1600 *SU1ER, VS6UQ, W2LT, W7WA*(LP), other *W7s*(SP), *YC4FRX, ZL3GQ, 9V1TL*. 1700 *OX3GQ, UV1OO, VE7CC, VU2JQS*. 1800 HV3SJ, VQ9QM. 1900 S79HW. 2000 *SU1ER*. 2100 J87CD, *DL6FBL/VP9*, 8P6RE. 2200 HH7PV. 2300 *FY4EE, VP2MDY, YC4FRX, 9M2AX*.

10MHz 0700 *JR0VRJ, 7X2AX*. 0800 *JA, VK3, VK5FE, ZLs 1HT, 1AQM, 3BJ*. 0900 *LZ1IA, W3-4, W7ESX*. 1300 *N4EAT*. 1400 *FM5BH, JH1DLJ, W8EGB, 5B4QG, 9V1TL*. 1500 *K7SP* (Ariz. LP), *9M2FP*. 1600 *VQ9QM, ZS5BH*, 1700 *W1-W4, W7HCO, ZL2ADX*. 1900 *ZS1TH*. 2000 *VK3MR, W1,2,3,4,8*. 2200 *KP4DJ, 4X6LL*. 2300 *HK1QQ, KX0T*.

14MHz 0800 BY4SZ, H44DL, NP4JV/KH2, KL7, VK, ZL. 0900 A61AB, BV2FA, FK25FS, TT8sAB, VQ, VK9ND, VS6AY. 1000 C56/G4YPU, *SM0OIG/LU*, 5U7IL. 1100 HL1SX, 5V7WD. 1200 QD5RA, 6T2MG. 1500 FT8WA, AH6GO/P2 S79KG, VQ9HW, YI1BGD. 1600 A22BW, KY0T/C6A, CO6HI, OX3LX, T77C, TJ1CH, VK0DA, VQ9QM, W6-7. 1700 VO9HW, ZD9CA, 5H3ZQ, 5T5SL, 5V7WD.

1800 D68QL, J28EM. 1900 D68WB, FR5DX, TZ6VV, VP8ADX, ZL4JQ. 2000 C56/G3VLH, HK0HEU, W7, ZD8CW. 2100 TR8SA, VP8LP, WL7E. 2200 FR5DX. W6, 8P9AF. 2300 C53BU, KC4USR, 6W6JX.

21MHz 0800, VK. 0900 FR5AG, TA3C, *TR8JJR*, YC6XE, ZS. 1000 D68OL, JY5DK, 4S7PVR. 1100 J28EM, TZ6WC, VK, YB0ZCA, 9M2BZ. 1200 *A82GA/5, V2ACW*, VI5AQZ, VK6VB, VU2AZP, ZS3SWA, 9K2SP. 1300 FR5DX, *J37A*, TA3B, *T77C*, VK6ABQ, ZS5XA, 6W1CK. 1400 A81F, *KQ1F/IHC8*, J37AE, 5A0A. 1500 HK0sBBX, *BKX, XE3AF*, Z21BP, 3B8CF, 5N0WRE, 7P8BE. 1600 D68OL, 5X5GK. 1700 9Q5PA.

28MHz 0800 VK6BA, 5B4SA. 0900 W3FYT/4X, 9J2FC. 1000 *FR5EM*. 1100 FR4DL, SV5DW, TA3B, *9J2EZ*. 1200 *D44BC*, FM5BH, *N9ACJ/6L*, J6DX. *VS6DQ, 5H3ZO, 5T5XX*. 1300 *FY5YE*, 5B4SA. 1400 *NP4A*. 1600 CE3DNP, *KP2N*, LU1VZ, *VP2MU*.

The following are thanked for news items extracted: *DX'press* (PA3CXC), *CQ Magazine* (W1WY), *DXNL* (DL3RK), *Long Island DX Bulletin* (W2IYX), *DX News Sheet* (G4DYQ), *The Ex-G Radio Club Bulletin* (Gt3QEN/W6), *Long Skip* (VE3IPR), *Lynx DX Group Bulletin (EA2JGQ)*, and the *DX Family Newsletter* (JH1KRC).

Closing date for receipt of material for **May** issue is **17 March**.

VHF/UHF

*Ken Willis, G8VR**

Calling channels

Two readers have written on the subject of the calling channel 144·300MHz, but with somewhat different viewpoints. Allan GM4ZUK (Aberdeen) feels strongly that the frequency should be retained, saying that in NE Scotland, the band can very often be empty even when beacon GB3VHF in the south is strong, so having a spot frequency on which to make and monitor calls is extremely useful. Operators in the south might take a different view since there, it is not uncommon to hear not just one, but two or three stations, all calling on the channel at the same time.

Paul Hadley, G6XRA (Glos) believes that 144MHz activity has reached the state where operation on it should now be much more like on the hf bands. He would like to see the ssb calling frequency abandoned and suggests a trial period during which the calling channel is expanded into a segment some 10-20kHz wide. This, he says, would not introduce any serious problems since most operators QSY well away from 144·300 once contact has been established on the calling channel.

The VHF Committee has tended to agree with Paul in their bandplan discussions, and in general would prefer to see "centres of activity" specified, rather than specific calling frequencies, this having the effect of narrowing the search but expanding the spectrum space available for CQ calls. In the more densely populated areas vhf operators tend to spread a bit either side of the calling channel anyway, if they are sensible, since QRM on the frequency is quite common when activity is high. I find that when writing about the subject I tend to use the words "channel" and "frequency" in the same context, mainly to avoid repetition, but is a channel a discrete frequency or can it not be a narrow band of frequencies?

Another aspect of this same topic is that after almost every vhf contest, someone complains that one or other of the contest groups sat on the calling channel throughout the event, ruining it for operators who are not participating. There have even been suggestions that the bandplan should be abandoned during contests, and so varied are the interests of the amateur fraternity that some support this suggestion strongly, while others see it as a violation of their rights. It is a fact that the bandplan can only succeed through voluntary acceptance and general observance, since it does not form part of our licence conditions. We shall hear more on this subject, especially if the ranks of vhf operators continue to grow and QRM becomes an even greater problem. Since band occupancy varies greatly between different parts of the country, it would seem that a modest spread either side of 144·300MHz would be sensible. Any personal decision to depart from the specific calling frequency should be based on the level of activity noted on the band. Why not try it? If nobody does, it will never happen.

Geomagnetic data

Last month the K and A geomagnetic indices were described. They are a regular feature of the GB2RS solar information broadcasts, and another index often mentioned is the "Indaa", which is short for "Indices na". These are three-hourly geomagnetic indices provided by two stations at the antipodes, Hartland, UK and Toolangi, Australia. Since one station will be in summer while the other is in winter, the aim of these measurements is to compensate for seasonal variations in geomagnetic activity by comparing the readings from both stations. However, when large differences are observed in the indices measured at the two stations, it usually indicates significant solar activity, perhaps a major storm. Charlie Newton, G2FKZ, says that it was suggested to him that the Indaa index be quoted because it is better for predicting auroral conditions, though he feels that the normal A index provides sufficient information. It is understood that work is under way to compare the results obtained from both types of data.

Information received from Ron Livesey, Director of the Auroral Section of the British Astronomical Association contained visual data from a group of his observers in the north who recorded their impressions of some dozen auroras during last November. Most of these were relatively minor events, and the lowest latitude at which they were observed was 59-60° as might be expected in the sunspot minimum period.

It is interesting to learn that amateur aurora observers in the BAA take their own magnetic measurements using a simple home-brew instrument,

*6 Lerryn Gardens, Broadstairs, Kent CT10 3BH.

the so-called "Jamjar magnetometer", which can be made cheaply with a minimum of tools. I recall that Mark, G4ISM, when at Whitstable, used a similar device. If any readers would like to build one for themselves, I can supply a photocopy of the relevant information if you send an sae plus 30p in stamps. Especially if you live in the north, you may be able to detect changes in magnetic levels using one of these magnetometers and relate them to radio auroras.

Repeater news

G6LMW, secretary of the South Lakeland Repeater Group, reported the installation of a WACOM duplexer to the GB3LD repeater at the Stewner Park, Cumbria, site, and said they are well pleased with its performance. They were also impressed by the service provided by WACOM in importing the device from the USA, since it was delivered to Manchester within three weeks of it being ordered. Installation was carried out by Dave, G8JAG, and the power of the repeater is now 18W erp.

Other information on GB3LD is that the antenna is a single Jaybeam Type 7051 dipole, fed by Andrews ldf 450 cable and favouring the one direction. This is installed on the BBC mast at Morecombe Bay, some 840ft asl. Wood & Douglas equipment with GB3US logic provides the main station equipment.

Anyone monitoring or hearing the Winchester digipeater GB3HP may wish to send reports to G1JAR, QTHR, who will much appreciate hearing from you. This repeater was built by members of the Amateur Radio Computer Club (AMRAC) and uses standard AX.25 packet protocol.

Following his move to Okehampton from Ringwood (reported elsewhere) Bill James G6XM says that most 144MHz activity in his new area appears to be on the repeater channels. This could be because the hills and valleys of the Devon countryside sometimes make simplex working difficult, so those living in unfavourable locations probably relish the chance of using the relatively unrestricted coverage of their area provided by a repeater. Not everyone agrees with me when I suggest that there can be a case for fixed stations to use repeaters on a regular basis, though it happens all the time in some areas. It would be interesting to hear the views of others on this point.

Doug Barnsley,EB5FYQ (Javea, Alicante) lives at the foot of a mountain which rises sheer to his north, but finds he can hit many repeaters in that direction using a collinear antenna to his TS-700. Doug has supplied me with a recent listing of all Spanish repeaters which I will post to anyone sending an sae plus 20p in stamps for copying. RSGB headquarters can supply information regarding a Spanish reciprocal licence. If you are holidaying in that part of the world this year, don't delay in applying. Spain is always full of visiting amateurs from all over Europe, so there is plenty of activity there, and in the Canaries and Portugal.

Mountain locations

Don Ayris, G4GZA (Lincs) recently visited OK1DIG in Czechoslovakia where he also met other OK amateurs. He was very impressed by their enthusiasm for vhf operation, and as many of us know from experience, the lengths they will go to in providing dx contacts for European vhf operators. We also know that many of them operate from mountain sites, which offer a good take-off towards the UK. Don observed no shortage of mountains in the country and even visited a few himself. What did surprise him, however, were the "relentless efforts" of some of the more elite OK operators who think nothing of travelling 30km or more to the foot of a mountain, where equipment is sent up in a ski-lift bucket following which the operators trudge through heavy snow in winter in a half hour climb to the summit. They will do this just to take advantage of a tropo opening. Don walked the mountain path of Milesovka to the shack of a meteorological station 837m asl which the locals use as a radio site. From this location, (JO60XN), OK1DVM/P (Mirek) and OK1DIG/P (Dan) had operated in the IARU contest just prior to Don's visit. On 432MHz, OK1DIG/P worked 548 contacts including 95 G, three GW and two GM stations, the best dx being a contact with GM4ZUK/P over a path of 1290km. The 432MHz log showed contacts with stations in 18 countries and 81 squares. On 144MHz, OK1DVM/P worked no fewer than 140 G stations. OK1DIG asked Don if he would mention the "good operator qualities of UK stations in a pile-up situation", and said also that this view was echoed by most OK stations who operate in contests or major openings.

From quite a different quarter came another mountain story, this time from Steinnar, LA9FY, who apologised for being 45 minutes late in starting a meteor scatter sked with G6HH in the early hours of 14 December during the Geminids. He operates from a mountain site for serious vhf dx work because the terrain surrounding his normal QTH does not offer a good take-off, but on this occasion the weather created serious problems during his drive to the site. His simple statement that "I did not make it to the mountain on time because of snow and almost storm weather since my QTH is 1000m asl" conjures up pictures of a lone figure in blinding snow at 0300gmt trying to see the road through a frozen-up windscreen while fighting wheelspin. At this end of the sked (as I can say since I was there) we were comfortably warmed by a fire and a drop of the stuff that cheers while waiting on frequency for the first sounds of Steinnar's signals, thinking that perhaps he had overslept!

Yet another mountain featured in correspondence, this time from Peter, HB9RUZ. His QTH is screened towards the UK, but 50km to the south a mountain rises to a height of 3000m. By beaming directly at it, he can use the mountain as a reflector, and by this method has managed to work some G stations and also GW4NXO, which was a new country for him. Peter still needs GD, GM, GU, EI in our direction if you fancy setting up some skeds with him. As for contacts with Vatican City, Monte Carlo and Andorra, although he is nearer to them than we are, he says: "patience is useless here, what you need is sheer luck!" Peter recently qualified for a VUCC award and some of the cards submitted in support of his claim showed that he had worked prefixes seldom heard in the UK, so there are a few advantages in being situated more centrally in Europe even if the surroundings there can be rather more undulating than we are used to.

Meteor scatter

Last month, a 144MHz meteor scatter contact was reported between Joe, 9H1CG and Gerald G4OIG. It is still not known whether this was a first, but it is certainly a long-haul for this mode. This contact did not just happen, but was the result of much planning and patient operating. Nine skeds were arranged between 11 August and 13 December (Geminids) 1986. Although information was exchanged during every attempt, it was not until the Geminids that contact was finally established, and even then the sked had to be extended beyond the two hours arranged for it in order to complete. Copy on that occasion at the G4OIG end was 30 pings and six bursts, the longest being of one second duration. The distance is estimated to be 2,190km. Equipment used by G4OIG was the "usual" 70W to a nine element Yagi, while 9H1CG had 100W into a 16 element.

Another operator who finds this mode both exciting and rewarding is Colin Morris, G0CUZ (West Midlands) who sent in some statistics which serve to put the matter of meteor scatter operation in perspective for those who would like to try the mode but feel, perhaps, that they lack the station equipment to operate it successfully.

Colin uses about 100W to a 14 element Yagi, fed with H100 coaxial but only 20ft above ground. In 500 hours of operation on 144MHz, he had 303 skeds or random attempts, which resulted in 113 complete contacts (95 skeds, 18 random). All but five were on cw, the others on ssb. The "bag" yielded 19 countries (eight new ones) and 77 squares (66 new!) by the mode. Some of the juicier prefixes were T7, HV and TK. Colin completed his survey by saying that the lowest powered station he worked by the mode ran just 15W, the highest 2kW. In a contact with EA7TL, Colin used only a five element antenna. Even better, EA2LU was worked with an indoor antenna up in the loft. The results of G4OIG and G0CUZ using quite simple and low power equipment should encourage others to try the mode.

Transatlantic 50MHz sporadic-E

We are indebted to Ray Cracknell, G2AHU, for some interesting comments on the fierce controversy which surrounds the mode of propagation of those elusive mid-summer transatlantic signals on 50MHz which have been observed every year since the last sunspot maximum. Ray says that now we are at the low-point of the solar cycle, with little chance of any F2 propagation occurring, interest in solving the mystery of the mechanism of propagation over such long paths is very high, and the time is approaching when such signals may appear again.

It seems certain that sporadic-E is involved in some way or another, but there are two main objections to conventional theories of three or four-hop Es propagation. First, the probability that there will be three successive patches of ionization in just the right spots is clearly very low. Next, the strength of received signals has often been too great to allow for two or three reflections from the rough surface of the North Atlantic, with its attendant scattering.

Ray says that the only way to solve this problem is to measure the time-delay between the transmitted and received signals, since this would give an indication of the path-length. In the past, amateurs have carried out such measurements using three different techniques. The first, the transponding method, requires the originating station to transmit a series of dots which are re-transmitted back from the far end. The time-difference then gives twice the delay time for the path. Next, in the comparative method, dots or pulses are transmitted simultaneously on two bands (say 50 and 14MHz), and if for one path it is assumed that the delay time is known, the difference

between the two readings provides information on the unknown path. Both of these methods will give good results over simple circuits, but when multi-hop paths are involved, multi-path effects are often introduced to confuse the results. Multi-path transmission can, under certain conditions, square the number of pulses received when using the transponder method, so if three paths happened to be open, nine pulses would be received for every one transmitted. Similarly with the comparative method, if the so-called "known" signal also suffers multi-path effects, it can no longer be regarded as a suitable standard for comparison. There is a third method which Ray regards as an absolute one, which makes use of independent time-signals derived from vlf standard-frequency and time signals at both ends of the circuit. Plans are afoot to build a 50MHz beacon with its frequency locked to a vlf standard, transmitting timed pulses between callsigns. In the USA, amateurs are looking at the possibilities for re-broadcasting facilities in the UK in order to carry out transponder tests. Ray will keep us informed of progress in these areas.

FM channelization study

Some time ago, the VHF Committee requested Angus McKenzie, G3OSS, to carry out a study of the 144·5 to 145·8 MHz section of the 144MHz band in view of the interference being encountered by operators in densely populated areas. At present, the segment 145·0 to 145·775 is channelized in 25kHz steps, whereas that part of the band from 144·000 to 145·500, officially is not. In practice, however, the region 144·500 to 144·875 is generally considered to be in 25kHz steps also. Although the study is far from complete, Angus has already made the point that there are clearly too few fm simplex channels available in at least three of the high-population areas of the UK, specifically, Greater London/Home Counties, West Midlands and Merseyside/Greater Manchester. He points out that there are only 13 simplex frequencies available without any "strings" attached, and a further 16 with certain reservations as to their use, while 24 channels are set aside for repeater input/outputs, calling frequencies or beacon frequencies. This severely limits the choice of frequency available for fm users in the 144MHz band. While no such problem exists on 432MHz, by far the highest level of fm activity occurs on 144MHz, and it is no solution to suggest that operators purchase expensive equipment for the higher band to overcome the interference problem which exists. One solution which G3OSS is investigating in depth is for the rechannelization of the 144·5 to 145·8 part of the band into 12·5kHz channels. A similar approach has already been adopted in the USA by the introduction of 15kHz channels in place of the original 30kHz steps, and Angus believes that 15kHz is probably the closest channelling which can be used with most existing rigs without major modifications being required. He observes, however, that many of the newer rigs would permit 12·5kHz channel operation, though as currently supplied, they do not have the correct filters installed. Yaesu and Icom filters are basically designed for 25kHz channelling, but some Trio rigs are normally fitted with filters which are suitable for 15kHz channelling. With 12·5kHz steps, there would be a total of 43 potential simplex channels plus eight new repeater channels, some of which might be set aside for ssb repeaters or other specialized purposes.

This is a highly technical study, and as it progresses, further information will be given. In the meantime, G3OSS would be glad to have individual views on the concept of narrower channels.

Quadrantids

For personal reasons I had to go to press early for the February and March issues, so there was not much time for reports on the 1987 Quadrantids to be received. G4IJE provided a run-down of 50MHz activity during the shower and commented that it produced excellent results on that band. He worked GM0FRT (IO87), GM3WOJ (IO77), GI0EYC (IO65), EI6AS (IO63), GM4ISM (IO85) and GM4NFC (IO75), all on random ssb meteor scatter. This shows what the band is capable of, since many were using very low power and simple antennas, though Paul agrees with the view expressed in an earlier issue by G3SEK, that one needs a bit of power and a "proper" antenna to do justice to all this band offers. During the shower, Paul noted several bursts in excess of 30s and at strengths over S5, and was able to chat with GM3WOJ on some of the longer bursts when Chris was waiting in vain for others to call him. Several stations are reported to have worked LA2AB (Oslo) after 2300gmt on 3 January. I have said it before, but will risk being labelled repetitive when I urge more people to use ms procedures on 50MHz, since this will make it possible for many more dx contacts to be made on what otherwise might seem to be a dead band. If anyone needs more information on ms procedures, send me an sae and I will outline what is required, though the *Amateur Radio Operating Manual* sets it all out in detail. The important thing is to call CQ for 1min, using a standard time-signal to indicate when to start and stop, and then to listen for the same period for a reply. Then continue to use 1min periods for sending and receiving. Unless activity is high in your area, who uses the first or second period to transmit is not too important, though if the use of the mode increases we shall need to adopt some form of convention for UK stations in future.

From here and there

Charlie Newton, G2FKZ, reminds club secretaries or events-organizers that tape/slide lectures are available from RSGB HQ which deal with vhf propagation. He suggests one entitled "Solar Cycle 21", while another, "Lights from space" describes auroral phenomena. Contact the membership services department for further information.

Subscriptions for *Dubus* (four issues each year) are now £8.50, and the distributor is Ken Hanon, G4IZW, Hamilton House, Carleton, Cumbria CA4 0AD.

Long-time 50MHz enthusiast Bill James, G6XM moved from Ringwood to Okehampton into a select area where no antennas of any sort were allowed! Undeterred, he applied for permission to erect a 30ft mast which could be retracted to 15ft and promptly ran into a lot of local opposition. He persisted however and eventually a site meeting was held attended by seven or eight councillors or planners, while RSGB was represented by Les Hawkyard, G5HD. Unexpected support came from a councillor (and mayor), who is licensed as G4MUH, and against all the odds, planning permission was granted. In these situations, a well-presented case properly documented will often bring unexpected results, and the moral is not to antagonize either the locals or the planners. Legal assistance provided by a solicitor knowledgeable in local affairs can often be of great value, and need not be expensive, especially if it leads to a lifetime of enjoyment from amateur radio. It doesn't actually hurt the situation if your mayor happens to be a ham, either!

Tony Collett, G4NBS (Cambridge) agrees with G4FRE that the top awards for 70MHz which require 10 countries to be worked need changing to take account of the actual number of countries licensed to use this band. But he thinks that 432MHz awards are too lenient in these days of modern equipment and good antennas. He also re-opens the locator controversy to the extent that he pleads for one system or the other to be used, and not both as is current practice, and he offers no support at all for the "latest" one, the so-called Polish system which uses a part of both the old European and the Maidenhead locators (eg AM61h which is JO02AF becomes AMAF).

Bill Barker, G4JIQ, who was previously 5B4HY, confirms that Nick, 5B4AZ, did make those disputed 70MHz contacts with the UK (see *VHF/UHF* for August 1986). He was a regular visitor to Nick's shack at the time, and 5B4A2 and 5B4HY were also involved in 144MHz tep tests with ZE2JV (G2AHU) who they worked from Cyprus on that band. Bill believes that the reason no further 70MHz contacts took place was because the G4BIY beacon transmitter which Nick was using, was then transferred "to its rightful place", namely the 5B4CY beacon site.

Adrian Dening, G4JBH (Yeovil), says he will gladly stand by for any dx stations wanting to work his square (IO80) via meteor scatter or other modes if they write to him QTHR or telephone 0935 23873.

Jan, OH1ZAA, regularly puts out test transmissions from KP01RO on 28·2675MHz to check propagation conditions and is hoping one day to provide a regular beacon service for this band and for 50MHz if authorization can be obtained. On 144MHz he has worked some stations on all three modes, tropo, ms and sporadic-E. He also has cards from stations claiming to have worked him when their calls do not appear in his log, so some folk apparently will go to any lengths to get an OH1 QSL. One OK station sent cards for all three modes! Jan says his favourite mode is sporadic-E, and he tells of an opening in 1984 when he worked 115 stations in 95 minutes, which he finds "more rewarding than listening to white noise for 200 hours to work a few new ones via meteor scatter".

If you are interested in vhf propagation and want to keep abreast of developments in tv monitoring in this part of the spectrum, *Screen Europe*, a newsletter published on a regular basis by Tim Anderson, G1JWR, and available on subscription, provides valuable information. Having been to see Tim's equipment and off-screen photographs of pictures received from all over Europe and North Africa, plus many from much more distant locations, I can vouch for Tim's experience in this field. Write to him QTHR for further details. □

MICROWAVES

*Mike Dixon, G3PFR**

Operating news

It was mentioned that some quite remarkable dx had been worked on 2·3GHz during the October contest. More information has come to hand from OK1AIY/P via DARC and Ken, G8VR. OK1AIY operated from JO70SQ and his log showed the following QSOs: 10 G, one GW (GW4FRE in IO81LQ at 1,296km as the best dx), 13 PA, 12 DL, one HB, five OK, one F and two OE stations, covering a total of 24 squares with an average QRB of 675km! His station used 20W rf to four 25-element loop Yagis: pretty remarkable results indeed.

More news in Ken's letter: HB9RUZ, a comparative newcomer to 1·3GHz was out in the same contest and with a 10W transverter and trough-reflector antenna, worked 20 squares. His home location is in the shadow of a 3,000m mountain which he uses as a reflector on all the vhf and uhf bands and is thus able "to contact nearly all of the regions of Switzerland".

Ken mentioned that he has now improved his station to 6W output, is using a receive preamp with his MM transverter and a single 23-element Yagi. He finds the band somewhat dead "unless there is a lift or contest on". Despite this he has succeeded in working nine countries. His request; "I leave the rig on the calling channel all the time and I wish a few more stations would look in the direction of Broadstairs during the evening—or the daytime."

Fredrick, G6FK, reported comparatively little activity following the October opening, but the skeds mentioned in earlier months are still running and yielding results. Newer stations on the band, regularly heard or worked in the Midlands are EI6AS (Dublin), G6SNI (Nantwich), G1LFM (Widnes), G8CVF (Merseyside), G6TLI (London) and G8IXR (Gravesend). Expected active soon are G1GRK (Tewkesbury) and G8KBH (Blackpool). Snippets of information on 2·3GHz: G3BPJ (Preston) now has one or two watts with an antenna being built; G6VKA (Tewkesbury) is active; GI3DOX (Barrow-in-Furness) is active again with 20W after rebuilding his damaged antenna system and GW3CCF is "almost ready to go".

After mentioning G8ESB's move from the Nottingham area, Dave, G6UWO, asked me to mention that he and John, G6JQL, are currently active in the Nottingham area with low power but will soon be adding amplifiers and also intend /P operation in the coming summer. As a result of regular Monday and Tuesday night nets, four more locals are building for the band. I've always said that activity breeds activity!

Beacon and repeater news briefly now: GB3MC (Winter Hill, beacon mode only, but due to go full function in January) has been heard in East Anglia; GB3SE (Stoke-on-Trent) became fully operational on 21 November on RM3 and is S9 at my QTH (about 40km away) with a quarterwave "whip" in the transverter antenna socket; GB3NO (Norfolk) has just received its licence as has GB3OHM (3·4GHz beacon, W Midlands)—both should be operational shortly. GB3BH (Bushey Heath) became fully operational on 31 December but on temporary antennas. The group has already received reports of reception from Herts, Essex, Beds, and London. The group will be happy to take reports and assist in setting up 1·3GHz equipment—all you have to do is call in on GB3HR on RB14! From the same group comes the news that GB3SWH (10GHz) is back on air following accidental removal of the power wiring from the church-tower radio room by maintenance electricians! Reports needed, please.

A local oscillator source—cont'd

Construction

The unit is built on 1·6mm epoxy glass double-sided pcb, one side used as a groundplane. The complete board will mount in a 127 by 78 by 45mm diecast box (Eddystone Radio 27134P). The pcb track layout is given in Fig 2, drilling and cutting details in Fig 3 and the component placing in Fig 4.

Fitting of components to the board begins with the grounding strips (copper foil) at the end of each of the printed lines, where shown. The resistors and capacitors are fitted next, taking care to ensure that all grounded leads are soldered on top as well as underneath the pcb.

Inductors L2 and L3 are wound as shown and soldered into place, ensuring that the axes of these two coils are in line. The two small side projections on L1 are removed with a sharp blade before it is soldered into place. The chokes are fitted next: take care not to bend the leads too close to the choke body so that the wire terminations break.

TR1 and TR2 are soldered into place, taking care to ensure correct lead orientation (see diagram). The body of the transistors should be no more than 2·5mm above the groundplane. The screen lead must be soldered to the groundplane. The regulator is now fitted, taking care to solder the centre lead to the groundplane.

Carefully solder the trapezoidal capacitors into place, taking care not to overheat them or they may fracture. Fitting these capacitors is easier if they are mounted with the shortest edge downwards. Solder a capacitor to the printed line or emitter track as appropriate and the opposite side of the capacitor to the top groundplane. Ensure the other side of the capacitor does not short to the groundplane.

Transistors TR3 and TR4 are then soldered into place in the holes provided and excess lead length cut off. The three leads are soldered taking

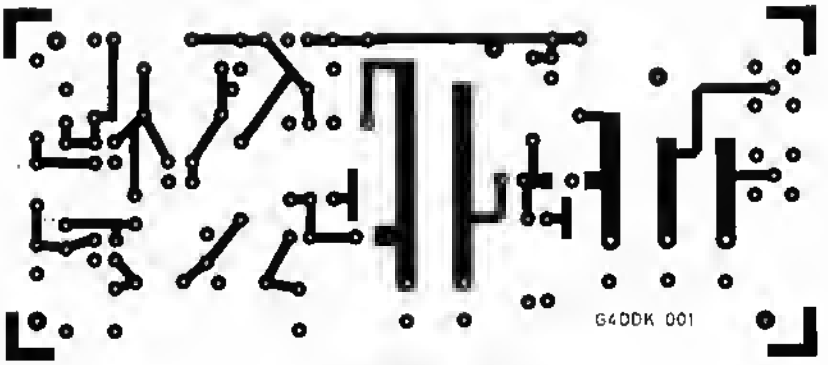
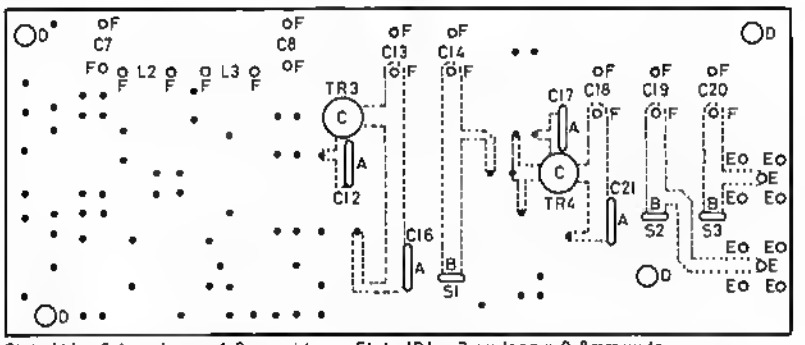
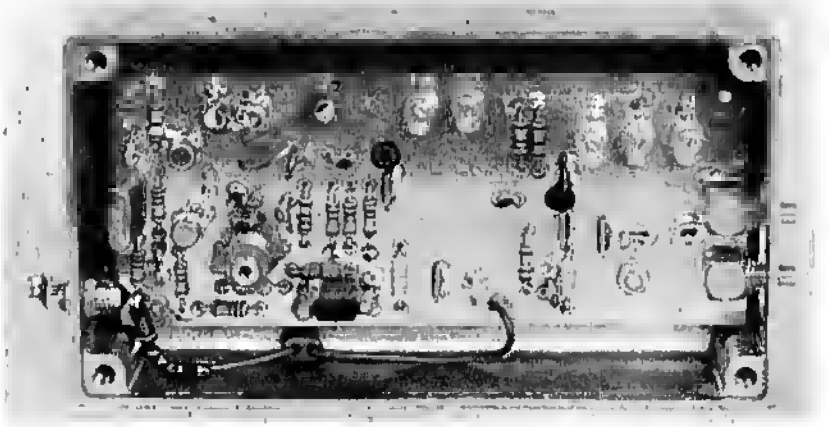


Fig 2. PCB track layout



Slots 'A'.... 6·4mm long x 1·2mm wide Slots 'B'.... 3mm long x 0·8mm wide
Holes 'C'.... 5mm dia Holes 'D'.... 2·5mm dia Holes 'E'.... 1·2mm dia Holes 'F'.... 1mm dia
Holes marked • are 0·8mm dia although 1mm dia is permissible if more convenient

Fig 3. PCB drilling and cutting details



G4DDK's prototype

*"Woodstock", Gaze Bank, Norley, Warrington, Cheshire WA6 8LL.

care not to overheat the decoupling capacitors or the transistors.

The trimmer capacitors are fitted with the earth lead bent out at 90° to the capacitor body, and then soldered down to the groundplane of the pcb. If Sky trimmers are used it is not obvious which end should be grounded, since neither connection is directly connected to the adjustment slot: they should be mounted as shown. The Oxley trimmer ground-lead is the one extending below the trimmer body. If in doubt, check with an ohmmeter. The rotor is the ground lead.

Miniature smb or smc angled connectors can be soldered to the board where shown. Alternatively coaxial leads may be taken direct to their respective mixers.

When the board has been assembled it is advisable to test it out of its box.

Alignment

An absorption wavemeter covering 96, 288 and 576MHz and multimeter are the minimum items needed for alignment. A 50Ω load (a 0·25W non-inductive resistor mounted, for instance, in the body of a bnc plug) and a simple power meter, such as that described on page 9.7 of the *VHF/UHF Manual*, are also desirable.

The initial tuning settings are:

L1 core	Level with the top of the former.
C7	50% meshed (assumes 10pF trimmer)
C8	75% meshed (assumes 10pF trimmer)
C13, 14	90% meshed (assumes 5pF trimmer)
C18, 19, 20	10% meshed (assumes 5pF trimmer)

These positions depend mainly on the type of trimmers used, and to a lesser extent on the dielectric constant of the board. When using Sky trimmers it is important to note that although a higher maximum capacitance is specified, the minimum values obtainable are lower than for the Oxley types. This explains the apparently odd values specified for C13, 14, 18, 19 and 20 in the component table.

Connect the multimeter in the supply lead to the unit and check that the current taken from a 12V source does not exceed about 180mA. If it does, switch off immediately and check for short circuits or incorrectly placed components. When satisfied all is well, align the crystal oscillator stage. This is done by tuning the wavemeter to 96MHz and placing it close to L1. The core of L1 is tuned until a response is observed on the wavemeter. Peak the response by turning the core. Check that the oscillator restarts after switching off and then on. If it does not, turn the core slightly and repeat until it does.

Retune the wavemeter to 288MHz and place it close to L2 and L3. Peak the reading by adjusting the trimmers C7 and 8. Connect the multimeter between ground and the emitter of TR3. The meter should be on a range no higher than 2V fsd. It is best to use a moving coil meter rather than a digital meter, since changes in the reading can be more easily seen! Peak the reading by adjustment of the two trimmers. The wavemeter should be used

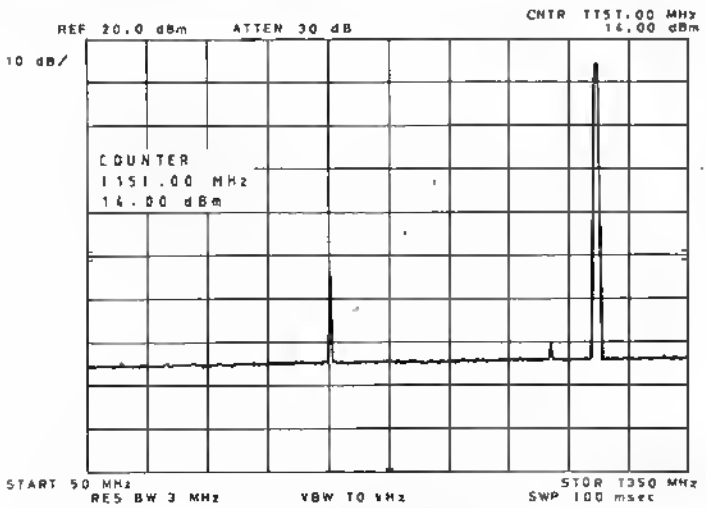


Fig 5. Typical output spectrum

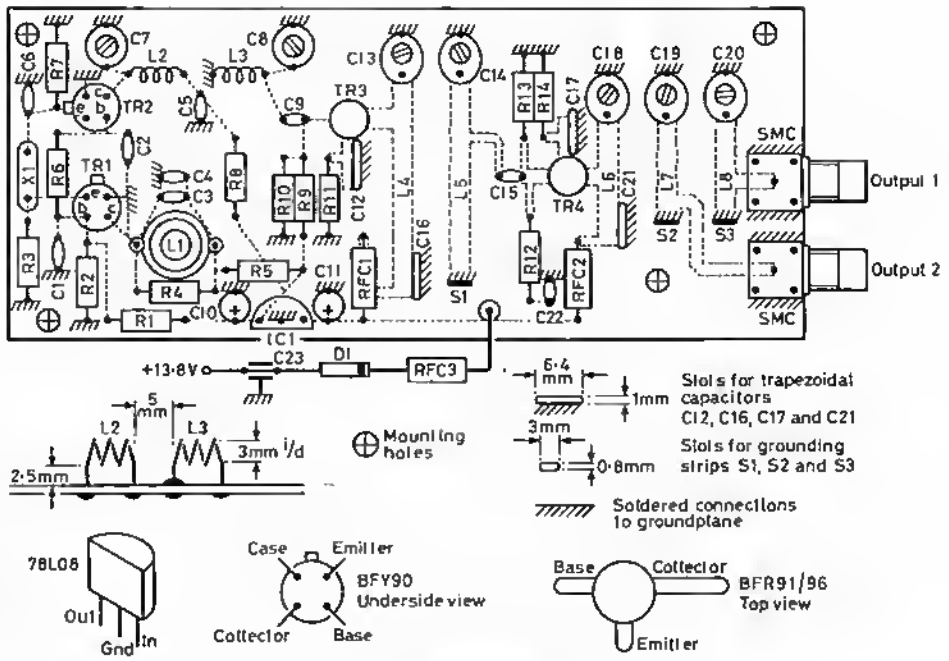


Fig 4. Components layout

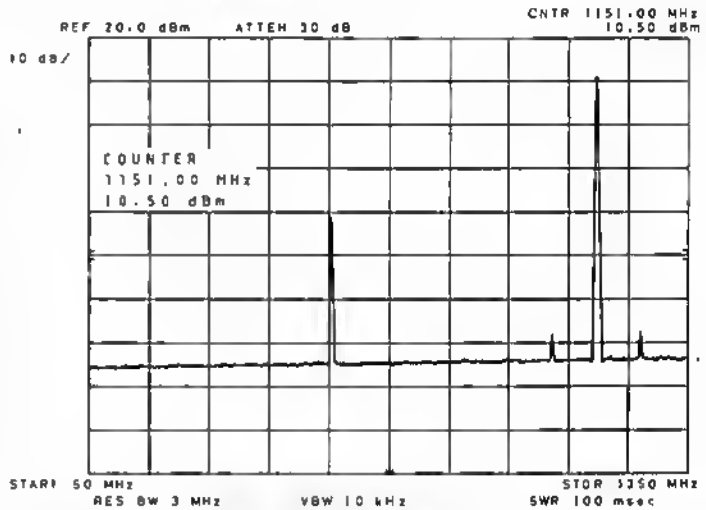


Fig 6. Typical output spectrum

to confirm the circuits are tuned to 288MHz.

Transfer the meter to the emitter of TR4 and tune C13 and 14 for a maximum reading on the meter. Again use the wavemeter to confirm these circuits are tuned to 576MHz. Go back to C7 and 8 and repeak the reading at the emitter of TR4.

Connect a power meter or 50Ω diode probe to output 2: Output 1 must be terminated in 50Ω. Tune C18 and C19 for maximum indicated power on the meter. Transfer the power meter to output 1 and terminate output 2 in 50Ω. Tune C20 for maximum indicated power. This should be close to 10mW. Repeak all tuned circuits, making sure not to retune them to some other harmonic of the drive frequency.

If only one output is required use output 1, cutting the tapped output from L7 where it leaves the stripline.

Exact frequency setting is best done by measuring the oscillator frequency with an accurate frequency counter. If this is done at 96MHz remember that the error is multiplied by 12, hence a 1kHz error becomes 12kHz at 1,152MHz. This would be regarded as too much by most operators and a final offset of no more than 5kHz would be appropriate.

When aligned correctly, the output spectra should resemble those in Figs 5 and 6.

The printed circuit board was designed to accept trimmer capacitors of approximately 5mm diameter. It is important not to use physically larger capacitors since this may lead to tuning problems as explained last month. The recommended trimmers are those made by Sky or Oxley. Other trimmers of similar size may be used, provided their capacitance range is similar.

Fig 4 shows an additional decoupling choke and protection diode. These components ensure transients and noise on the power supply do not cause problems with oscillator stability or purity. The diode serves the additional purpose of protecting the unit against reversed power supply.

Finally the board is mounted on 2·5mm countersunk bolts fixed into the bottom of the box—three nuts on each act as spacers for the board which is held in place with another nut on the top of the board.

If there is sufficient interest in this board, the components service will be prepared to have some produced: please let me, or any other Microwave Committee member, know of your interest. It is hoped to publish details of an inexpensive amplifier soon which will raise the power output into the region of 100 to 200mW: at this power level when fed into a suitable multiplier, output at 10GHz should lie in the 15 to 20mW region.

Errata

In the first part last month, TR3 in the components list should be BFR91, not BFY91, and in the circuit diagram it should also be BFR91, not BFR96. □

SATELLITES

*Bob Phillips, G4IQQ**

ONE OF THE CRITICISMS often directed towards any group of enthusiasts or specialists is that they tend to become an elite group or at least that is the way it seems to those outside the group. This is usually seen as manifesting itself by the use of jargon etc which may be regarded as a way of limiting knowledge of the subject matter to a selected few. This charge has, on more than one occasion, been laid at the door of the amateur satellite fraternity, though to be honest I do not think there is much foundation to it. The use of abbreviations and specialist terms is a necessary part of any technical subject, or non technical one for that matter. The danger, of course, is that those involved in the subject may forget that others may well want to join their ranks and perhaps feel put off.

I make the above remarks by way of introduction to devoting some space over the coming months to some of the basic terminology used in amateur satellite communications. This month I will start with the characteristics of the satellite orbit as described by the Kepler elements.

Kepler elements

Prior to the launch of Oscar 10, most amateur satellites were placed into quite low circular orbits and it was possible to define the orbits in very simple terms. In fact the minimum set of information comprised the altitude and inclination of the satellite orbit and a reference time when the satellite crossed the equator. The launch of Oscar 10 (which uses a highly elliptical orbit) coupled with the increasing use of computers lead to the need for more accurate ways to specify the orbit. A set of orbital elements (usually referred to as the Kepler elements) are used to define the orbit.

The orbit of any satellite around the earth is an ellipse, the size and shape of which is determined by semi-major axis (a) and eccentricity (e) as shown in Fig 1 (note that a circle is a special case of the ellipse where the eccentricity is 0). As the satellite moves in its orbit, its nearest approach to the earth occurs at the perigee, (P), and the furthest distance from the earth is at the apogee, (A).

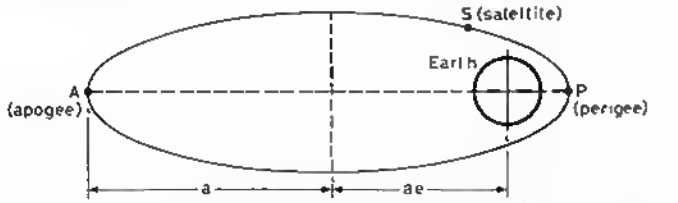


Fig 1. Diagram defining semi-major axis (a) and eccentricity (e) for an elliptical satellite orbit

In order to be able to specify the orbit in space it is necessary to use a co-ordinate system. The usual system is that based on the earth, and in particular a plane through the equator. Fig 2 shows the orbit of a satellite, (S), which is inclined at an angle (i) to the equatorial plane. The points A and P again refer to the apogee and perigee respectively. The point in the orbit at which the satellite crosses the plane of the equator, while moving towards the north, is referred to as the *ascending node*, (N). The orientation of the elliptical orbit within the orbital plane is defined by the angle (ω) between the perigee, P, and the ascending node. This parameter is known as the argument of the perigee and for most satellite orbits the value changes with time, depending on the inclination of the orbit.

Since the earth is rotating around its own axis, it is necessary to fix the orientation of the orbital plane with respect to some point outside the earth's co-ordinate system. The point chosen is the first point of Aries, which is a fixed point in space and is used for measuring the positions of stars. Looking from the centre of the earth along the equatorial plane, the angle between the first point of Aries and the ascending node, N, is called the *right ascension of the ascending node*, (Ω).

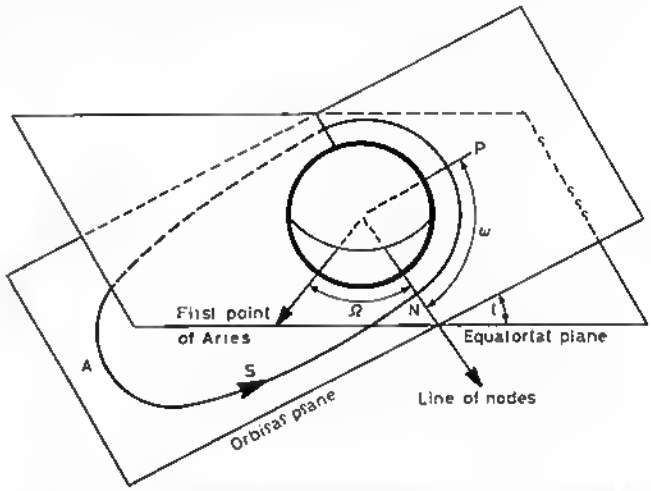


Fig 2. The position of a satellite in orbit showing the ascending node (N), RAAN and argument of perigee

We have now specified five parameters: semi major axis (SMA), eccentricity (e), inclination (i), argument of perigee (AP) and right ascension of ascending node (RAAN) and these fully specify the orbit of a satellite. One further element is required to fix the position of the satellite in its orbit at a particular time and this is the mean anomaly (MA), which simply defines the position of the satellite as measured from the perigee of the orbit. It should be noted that the mean anomaly is measured in terms of time units rather than degrees and one complete orbit comprises 256 MA units (however a 360 MA unit system is sometimes used —take care!).

So there you have it, a method of specifying the orbit of any amateur satellite which can be used to determine tracking data. The terms used might

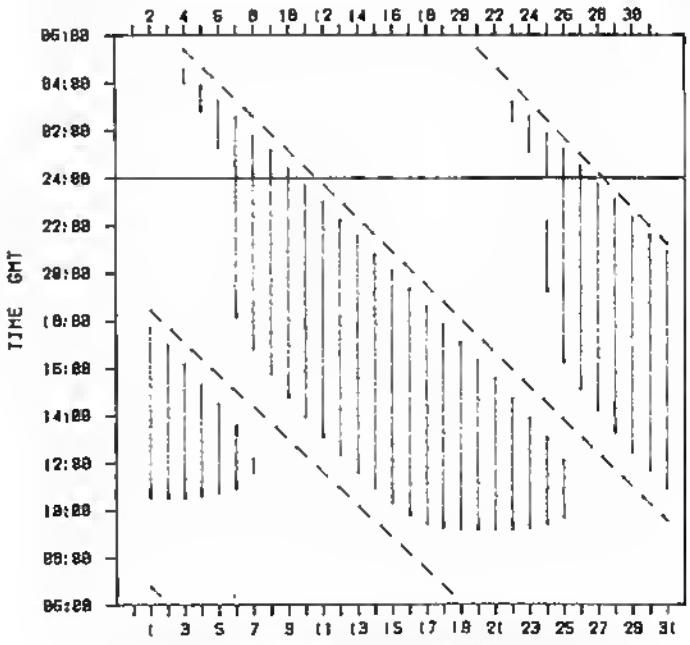


Fig 3. Oscar 10 visibility (London area)—March 1987
_____ satellite in view - - - - - perigee (MA=0)

*Transvaal Cottage, New Barn Road, Swanley, Kent BR8 7PW.

sound complex, but they are based on those used some 300 years ago by astronomers and only require a basic understanding of trigonometry.

Oscar 10

The news of the satellite is not good. In fact it appears that, in spite of all the efforts to regain control, the satellite cannot be controlled by ground command anymore. The situation in mid-January was that the mode B transponder (435 to 144MHz) was stuck in high power mode. In fact due to the good solar illumination conditions, signals through the satellite were very good. However, due to the non-optimum pointing of the spacecraft, there was a great deal of spin modulation in evidence. How much longer the satellite will continue to be serviceable is difficult to predict. The satellite controllers are encouraging continued operation (subject to observation of notified MA ranges) and with this in mind I have included an availability chart for the month. Fig 3 shows that the satellite is available for increasingly longer periods of time, due to the gradual movement of the apogee towards the northern hemisphere. I should, however, point out that the elevation angle for considerable parts of some orbits is quite low and the satellite may not be visible to the extent shown for locations to the north of London.

Late news. I have been advised by Jim Miller, G3RUH, that the satellite should not be used during March due to low levels of sun illumination—more details next month.

RS satellites

Both RS5 and RS7 entered periods of eclipse in early January and generally were not available for operation. This particular season will be over towards the end of March when, with luck, both satellites will return to normal service. Both of these satellites carry mode A transponders (29 to 144MHz) and RS7 also has a cw robot facility.

Other news

Following mention of growing interest in weather satellites, Barry Titmarsh, GM8SAU, has sent me a lot of information together with some very impressive images. Space permitting I will include more details in future issues. □

SWL

*Bob Treacher, BRS32525**

LF reports

Following my references to dx on the lower frequency bands, a number of listeners have provided confirmation that conditions were good at the turn of the year. BRSs 1066, 8841, 46598, 87259, 87156, 25429 and 52543 all sent in reports. Coupled with what I heard, here is a brief rundown on what was around. In excellent shape was 7MHz—far better than is usual in January. Several correspondents reported 70 plus countries heard on the band within the first two weeks of January. Conditions had been particularly good to Africa—ZS, S92, TT8, 9X5—while around 2200, the Caribbean had been well represented—6Y5, J73, KP2, T19, 9Y4, KP4. During late afternoon YB, JA, VU and S79 had been heard from the East. At sunrise VK, ZL, South America plus the more exotic Pacific dx from ZL7, ZL8, KH3 had been reported. KL7 stations had been reported after 0830. All in all, 7MHz certainly delivered the goods in the early part of January and it will be no surprise to see a number of listeners with 100 countries heard on the band by the end of January.

By comparison 3·5MHz did not provide quite the range of dx expected of it at the turn of the year. JAs, YBs etc had been heard before 1630 but the long path opening to the USA west coast had been poor with only weak signals from W6 and W7 being heard on two occasions. The long path appears to have been better earlier in the winter this year, which is unusual. Unfortunately, many Gs were heard in the dx segment of 3·5MHz having local QSOs, while LA, SM and OH stations were working dx around 1500. Some just do not know of the dx capabilities of the band, others simply do not want to know!

Martin Parry, BRS52543, reported lots of listening from 0530 to 0830. He does not have to be at work until 0930. His dx list was impressive as were Mick Hudson's, BRS87259, and Tony Blackburn's, BRS87156. Tony mentioned KH6AFS (0450), VE8RCS (2300), K1DQV/KP4 (2140), ZF1RC (0200), K2BMI/KP2 (0215) and HI8WA (0115). Mick's log noted JA1NRH (1548), VK2AVA (1859), S79LJ (2125-QSL via G4LJF), TI5EWL (2248), KH0AC (1647), I8CZW/4S7 (2058) and C6ANX (0821). Robert Small, BRS8841, not to be outdone, heard VK9NS, 5X5GK, W6s up to 0900, TI9W, FY7AN and several VE7s. Colin Watson, BRS46598, referred to VQ9YR (2216), VE8HL (1914) and VE8RCS (2145). Also mentioned was K8UR/1 heard at 0955 working LA stations. Brad Bradbury, BRS1066 mentioned several cw scalps—KH6AM, KK7K/DU2, VE2EDK (zone 2) and 8P9AJ (via K4UVT). I can also report some activity on this band, including C21RK for No 267 on the band, and KG4XO (Guantanamo Bay). Last, but by no means least, we have 1·8MHz. Several important occurrences to mention. First, that the ONs were able to use the band from 2300 on 31 December. Many had been heard, making Belgium the most represented country on the band at the beginning of January. Second, several KL7s had been heard between 0500 and 0635 both on ssb and cw. ON provided BRS1066 with country No 91—9 more to go! Conditions to North America had been good around midnight, with stations from the mid-West audible too. Some Caribbean dx had been heard—KP2J (No 77 for BRS8841), HK0HEU, J88BK, 9Y4AT and HP3FL. From Europe RZ1OWA had been reported from Franz Josef Land at 0020 and 0530, while on cw there were plenty of HAs on offer.

All time countries table
(entry score 700)

Station	DXCC	28	21	14	7	3·5	1·8	Total
BRS 25429	-	280	315	337	264	246	112	1,554
BRS 32525	326	268	306	320	268	267	112	1,541
BRS 8841	320	256	294	317	248	233	77	1,425
BRS 48909	-	216	255	276	205	189	80	1,220
BRS 52543	-	195	241	259	201	185	80	1,161
BRS 50134	-	178	218	244	185	175	89	1,089
BRS 1066	296	197	214	272	181	133	91	1,088
ORS 45992	297	216	260	280	165	136	18	1,075
BRS 31879	218	97	146	187	151	118	64	763
BRS 31976	248	145	117	166	84	135	64	711
Average	-	205	237	266	195	182	79	1,164

HF news

BRS1066 added D68QL on 21MHz for country No 296, and A6XL on 14MHz. BRS87259 reported lots of 14MHz dx, including S79GQ, J28EM, FT8WA, BV2FA and 9Q5FF. BRS8841 found time to log FK8CP, K4YT/DU1, several VKs and CP1NK on 14MHz, but on 21MHz heard 9N5YIDY for a new one on 21MHz cw, and FT8WA, also on cw. We all hope the LA expedition to Peter I Is did not founder in the icepacks of the Antarctic, because it would have been a new one for everybody.

Other news

David Whitaker, BRS25429, has acquired a Kenwood R820 receiver, almost mint, which he was putting through its paces. He also had a winter break in EA8 and noticed a dozen TH3s, or similar, antennas during his sightseeing trips!

BRS50065/9V1 provided some incorrect information which I included in the October 1986 issue (p719). He will be listening on 7,004, 14,004, 21,004 and 28,004kHz between 0400-0630/1600-1800 daily. He will be happy to confirm any swl report he receives. I await details of his 9V1 callsign so the information can be put to good use.

GW0DLW sent details of a new award which is available to swls. The Border Award is based on hearing stations around the England/Wales border. The full rules can be obtained by sending an sae to the Awards Manager, PO Box 6, Oswestry, Shropshire SY11 1ZZ.

VHF happenings

Once again some licensed operators showed, during the Quadrantids meteor shower, their inexperience of vhf by conducting local QSOs on the ms calling frequency of 144·200MHz while the shower was in full swing. Others were actually heard calling stations who were using the ms calling procedure and were clearly looking for dx replies by ms. A good grounding as a listener on the vhf bands would clearly have been a worthwhile bonus to these types. It may pay everyone to do some research to see what ms entails and to note when the showers take place to avoid making QRM to those amateurs who enjoy their dxing using ms propagation. The shower itself seemed quite good with two periods of quite intense activity—from 1400 to 1630 on 3 January and 0015 to 0230 on 4 January. During the first period 13 stations were heard, including SM5BE1, LA2AB, LA9FY, OE3NFL, SM5MIX and EA6FB. The second period, which was likely to have included the peak of the shower, provided good bursts from 13YXQ, I8WES, SP3MFI, HG2NP, I4YNO, OE6WIG, SP9CSO, HG6KVB, YU7FF and OK1KRA. The Geminids shower in December was monitored by Mick Toms, BRS31976. On cw, he heard UG2AB. Mick has the signals on tape and is convinced he logged the callsign correctly. So, do any of the

*93 Elibank Road, Eltham, London SE9 1QJ.

serious ms fraternity have any information—was he in UG, a long long way on vhf, was it a special call from one of the other republics, or is there another explanation?

Finale

The 1986 table will be reproduced in its final form next month. Let us have your entries for the new style 1987 tables as soon as possible. News and views for the May issue should be with me no later than 9 March with late news by 18 March. □

DATA COMMS

*Ian Wade, G3NRW**

Packet pickings

Commiserations for the one that got away go to Bob Fuller, G8CEZ, who got a PK232 TNC for Christmas, and on the afternoon of 3 January left it monitoring 144·650MHz. Returning later to the shack, he was a little miffed to see he had missed a couple of beacons from OE5GDL, digipeated via OE5XZL, with the message "METOER [sic] SCATTER Loc G180e"! "Oh well, next time", sighs Bob.

Mike Dennison, G3XDV, chairman of the RSGB Repeater Management Group (RMG) reports the re-formation of the Packet Working Group (PWG) as a subcommittee of RMG. Terms of reference have yet to be decided, but networking will undoubtedly feature large. Anyone interested in contributing to the new PWG should contact Mike, giving details of qualifications, affiliations and experience. In particular (but not exclusively), he is looking for those associated with organized packet groups and with licensed digipeaters. He also says that RMG are now inviting applications for new digipeater licences. Contact Mike (or Martin Stubbs, G8IMB) for more information and application forms.

MAXPAK (Midlands AX.25 Packet Group) are putting on a packet demonstration at the RSGB NEC Convention at the end of this month. There will be three packet stations; two of them being on the Raynet stand, with a third located elsewhere in the hall, acting as a digipeater. More details from Andy Witts, G1DIL. I will also be at the NEC, on Saturday 28 March, presenting a talk and live demonstration entitled "Practical Packet". Coverage will be aimed at beginners who want to know what equipment is needed to run packet, how to set it up, where to find packet signals on the air, and how to use digipeaters and mailboxes. Look forward to seeing you there.

Amtor primer, part one

Interest in Amtor as a replacement for rtty on the hf bands is becoming more widespread, and many people have asked me where they can find out more about it. There is a list of Amtor references in last July's *Data Comms* column, but these relate to articles which were published seven or eight years ago, and therefore difficult to get hold of; or to material which is not readily available in this country. So, in an attempt to fill the gap, I will devote the next few columns to tutorial sessions giving a potted description of how Amtor works and what equipment you need to run it.

To begin with, Amtor is an acronym for *Amateur Teleprinter Over Radio*, and was devised in the late 'seventies by Peter Martinez, G3PLX. It is based on CCIR recommendation 476-3, and is intended for sending rtty-style messages reliably over radio links. Its main feature and advantage over rtty is that there is built-in error detection, so that if part of a message is corrupted by interference, the receiving station can automatically ask for it to be sent again. With rtty there is no error detection and any corrupted message characters are irretrievably lost.

Amtor error detection

Amtor uses a special 7-bit character code, known as the Moore code, or International Telegraph Alphabet No 3. With any 7-bit code, there are theoretically 128 possible code combinations, but Amtor only uses 35 of them (see Table 1). These 35 codes are special, in that they are the only combinations having exactly four "1" bits and three "0" bits. This fact is made use of at the receiving end. As each character is received, the "1" bits are counted, and if there are exactly four of them, the character is regarded as valid; otherwise it is rejected. This works well most of the time, provided that interference has not corrupted individual bits in such a way that there are still four "1" bits in the received character, but the wrong four. For example, the letter *J* is transmitted as 0010111, but interference may flip a couple of bits so that 0011011 is apparently received instead—this also has four "1" bits, and would be accepted as a letter *F* without question. This kind of error does occasionally occur, so Amtor is not completely foolproof. Nevertheless it is still very much better than rtty, which has no means at all of detecting errors.

Because there are only 35 different code combinations in Amtor, most of the codes have two meanings, depending on whether they are preceded by a letter shift (LTRS) or figure shift (FIGS), just like rtty. Moreover, certain codes even have a third meaning. These are the Amtor control characters, which are responsible for acknowledging successful or unsuccessful receipt of a data block, or for getting two stations into sync, and so on. These control characters will be explained in more detail in a later column.

Table 1. The Amtor code. Each character has four "1" bits and three "0" bits. The characters RQ, IDLE1/2, CS1/2/3, α and β are control signals.

Code	Hex	Dec	Ltrs	Figs	Code	Hex	Dec	Ltrs	Figs
0001111	0F	15	α or IDLE1		1001110	4E	78	U	7
0010111	17	23	J	BELL	1010011	53	83	D	WRU
0011011	1B	27	F	%	1010101	55	85	R	4
0011101	1D	29	C	:	1010110	56	86	E	3
0011110	1E	30	K	(	1011001	59	89	N	, CS3
0100111	27	39	W	2	1011010	5A	90	LTRS	
0101011	2B	43	Y	6	1011100	5C	92	SPACE	
0101101	2D	45	P	0	1100011	63	99	Z	+
0101110	2E	46	Q	1	1100101	65	101	L	) CS1
0110011	33	51	β	δ	1100110	66	102	RQ or IDLE2	
0110101	35	53	G	@	1101001	69	105	H	£
0110110	36	54	FIGS		1101010	6A	106	NULL	CS2
0111001	39	57	M	.	1101100	6C	108	LINEFEED	
0111010	3A	58	X	/	1110001	71	113	O	9
0111100	3C	60	V	=	1110010	72	114	B	?
1000111	47	71	A	–	1110100	74	116	T	5
1001011	4B	75	S	'	1111000	78	120	CARR-RTN	
1001101	4D	77	I	8					

Amtor modes

It is possible to operate Amtor in four different modes:

1. Mode A—Automatic Repeat Request (ARQ).
2. Collective Mode B—Forward Error Correction (FEC), to all stations.
3. Selective Mode B—Forward Error Correction (FEC), to one specific station.
4. Mode L—Listen mode, for monitoring Amtor traffic.

An Amtor CQ call is usually sent in collective Mode B, and then, when a station replies to the call, the QSO itself takes place in Mode A; this is described in more detail below. Selective Mode B allows messages not requiring any acknowledgement to be sent to one specific station; this is rarely used in amateur QSOs. Collective and selective Mode B will be covered in a future column.

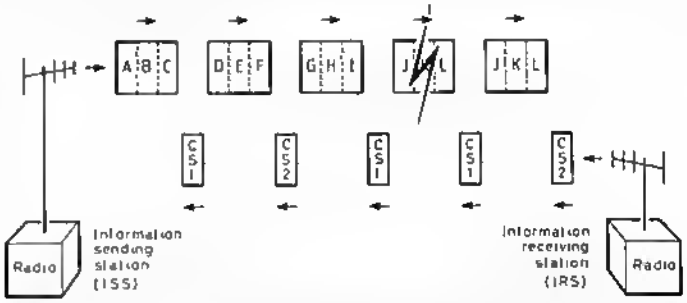


Fig 1. Sending an Amtor message in Mode A: Automatic Repeat Request (ARQ) mode. The Information Sending Station (ISS) breaks the message down into three-character data blocks, and the Information Receiving Station (IRS) acknowledges receipt with the control signals CS1 and CS2. Normally, when the message is being received intact, the control signals alternate CS1/CS2/CS1/CS2. . ., but if a data block is corrupted by interference, the IRS repeats the most recent control signal until it eventually receives the block without error

Amtor Mode A

Once a QSO is established, both participating stations automatically switch to Mode A. The station sending a message is known as the Information Sending Station (ISS), and the station receiving it is the Information Receiving Station (IRS)—see Fig 1. The ISS automatically breaks down the message to be sent (ABCDEFGHIJ . . .) into blocks of three characters, and after sending each block expects the IRS to respond with a control signal. Under good conditions, when the message is being received intact, the IRS responds with alternating control signals CS1 and CS2, and as long as the ISS receives these alternating signals, it will continue to send successive blocks of the message. However, if a block is mutilated by interference, the IRS asks for it to be retransmitted, by sending the latest control signal again. □

* 7 Danbrney Close, Harlington, Dunstable, Bedfordshire LU5 6NF.
Prestel Mailbox 219999743

Contest News

IARU Region 1 SSB Field Day 1986 results

The 1986 event produced the same number of entrants as in 1985 and if that year produced the closest finish, 1986 produced a record score for the winning entrant.

It is pleasing to note the increasing scores of the winners in respect of prevailing conditions and we wonder what the winning score could be when we reach the next peak in conditions.

The first and second places in the Open Section were fought out by the same two stations as last year, but this year it was Lichfield ARS, G3WAS, who came out on top followed by last year's winners the Mid-Beds Contest Association, G4MBC. It is interesting to note that while G4MBC had a few more multipliers overall, G3WAS managed more QSOs and averaged over 60 per hour throughout the contest.

In the Restricted Section last year's winners the Three "A"s Contest Group came out on top again and special mention must be made of this group's achievement in winning the restricted sections in both Field Day events in 1986.

The standard of log keeping showed some improvement and the scoring of the logs was generally good with the exception of one or two entries from groups who should perhaps spend a little time before the contest with an up to date countries list. It is surprising that unmarked duplicates still appear in some logs, perhaps the forfeiture of ten times the claimed score is not enough!!

The committee thanks all the entrants who took the trouble to submit comments with their logs, a cross section of these is produced below, we also thank G0EHK and OZ5EDR/P for submitting check logs.

Finally the adjudicator would like to thank those people who wrote to him with notes of thanks and encouragement—this contest took around 100 hours to check and produce these results, it is very gratifying to know that you do appreciate the work of the contest committee.

G3KDB

Comments received with logs

"Had trouble with the delta loop, and the station was off during the night and changed to a G5RV at daylight—hence the low score"—G6HH.

"The transmitter would only give 50W before speech broke up; alu went u/s and very mixed conditions led to a half-hearted effort"—G4UCR.

"Spent the first two hours transmitting into a short circuit; however, still worked 21 stations of which 10 gave us 59!"—G3PRC.

"Generator problems—it cut out at least three times due to dirty petrol or overheating"—G0FDX.

"Very confusing with all those OZ stations using EDR & EVA suffixes and not stating /P all the time"—G3GRO (No entrants lost any points because of this problem—G3RKB)

"Two of us decided to travel to GD and beg, borrow or as a last resort hire and buy everything we needed. We operated the whole contest with just the two of us and we wonder what level of manning the other groups use"—GD3FVA.

"Before the start one of the team said 'I'll be satisfied with 1500 QSOs and 150 multipliers' both targets were beaten. Gremlins struck as usual with both generator and rotator needing to be replaced before the start and G3NLY's linear blew up for the third year running"—G3WAS.

OPEN SECTION

Posn	Callsign	Group	NUMBER OF POINTS/MULTIPLIERS 3·5MHz	7MHz	14MHz	21MHz	28MHz	Total	QSOs claimed	Score
1	G3WAS/P	Lichfield ARS	973/30	709/21	2,700/58	465/32	261/20	5,108/161	1,479	822,388
2	G4MBC/P	Mid-Beds Contest Ass	807/23	972/26	2,229/58	418/40	197/18	4,623/165	1,322	762,795
3	GM5VG/P	Windy Yett Group	557/11	431/10	2,056/57	894/22	654/17	4,592/117	1,281	537,264
4	GM4AGG/P	West of Scotland 'A'	1,077/15	543/13	1,108/38	845/33	667/22	4,240/121	1,102	513,040
5	G3FYO/P	Pontefract & Dist ARS	903/29	635/18	1,960/46	199/17	205/13	3,902/121	1,082	472,142
6	GW4NZ/P	Port Talbot ARS	658/17	608/24	1,633/33	618/12	14619	3,683/95	1,033	347,985
7	GD3AHD/P	Liverpool & Dist ARS	785/14	416/14	1,162/39	689/18	299/15	3,351/100	879	335,100
8	GW4CC/P	Swansea ARS	1,036/15	438/8	575/27	652/23	731/22	3,434/95	992	326,230
9	G4IRC/P	Ipswich RC	1,263/19	42011 1	511/30	555/36	165/14	2,9411 10	785	320,540
10	G4AAX/P	Northumbria RC	633/13	264/5	1,392/57	408/20	177/14	2,874/109	764	313,266
11	GW4EZW/P	Newport ARS	1,062/21	19/16	1,308/40	337/16	150/13	3,048/96	813	292,608
12	G8JC/P	Worcester & Dist ARC	997/23	427/11	1,148/44	204/11	18/18	2,960/97	814	287,120
13	G4HRS/P	Horsham ARC	1,111/28	18/19	588/36	345/21	282/18	2,508/112	672	280,896
14	GM0BRS/P	Border ARS	640/11	228/12	1,114/37	776/32	55/6	2,813/98	741	275,674
15	G3SFG/P	Southgate ARC	1,308/17	655/14	685/24	309/14	221/17	3,178/86	716	273,308
16	G4HSF/P	Merseyside Special Event	875/21	596/12	938/36	378/17	7619	2,863/95	749	271,985
17	G3ASR/P	Edgware & Dist RS	949/19	541/15	520/27	386/23	16219	2,558/93	629	237,894
18	G3NWR/P	Wirral ARS	443/13	427/10	644/31	579/21	451/18	2,544/93	664	236,592
19	G4FPO/P	Stamford & Dist ARS	564/10	465/10	2,006/36	94/10	913	3,138/89	902	216,522
20	GM4TMS/P	Stirling & Dist ARS	766/16	72/5	558/26	1,026/22	143/11	2,565/80	661	205,200
21	G3GIZ/P	Chester & Dist RS	775/14	114/6	1,146/33	365/15	-	2,400/68	688	163,200
22	G4KIU/P	West Kent ARS	560/12	526/13	468/28	178/17	160/13	1,892/83	495	157,036
23	GI3XRO/P	Bangor & Dist ARS	348/10	148/5	342/20	596/19	721/16	2,155/70	543	150,850
24	GM3ZRC/P	Greenock & Dist ARC	729/12	672/13	462/17	245/6	429/11	2,537/59	620	149,683
25	G3BPK/P	Douglas Valley ARS	765/14	525/13	510/16	270/14	82/7	2,152/64	538	137,728
26	G4ADM/P	Sutton Cheam RS	827/20	103/5	480/25	-	302/12	1,712/62	437	106,144
27	G3AFT/P	Grafton RS	587/13	-	677/34	279/11	10/2	1,553/60	454	93,180
28	G4ECT/P	Cheshunt ARC	417/10	368/11	165/17	185/12	212/13	1,347/63	371	84,861
29	G4PVO/P	Droitwich ARC	799/12	33/19	170/8	378/12	2/15	1,702/46	387	78,292
30	GW0EJE/P	Pembrokeshire RS	485/10	418/11	150/9	193/9	32/2	1,278/41	303	52,398

RESTRICTED SECTION

Posn	Callsign	Group	NUMBER OF POINTS/MULTIPLIERS 3·5MHz	7MHz	14MHz	21MHz	28MHz	Total	QSOs claimed	Score
1	G0AAA/P	Three 'A's Contest Group	946/23	753/21	662/39	306/28	226/17	2,895/128	706	370,560
2	GD3RFH/P	Western ARC	805/16	618/14	620/32	578/24	556/18	3,177/104	834	330,408
3	G3NJA/P	Torbay ARS	1,056/22	375/11	411/30	412/28	337/17	2,591/108	641	279,828
4	GM4TOO/P	West of Scotland 'B'	689/14	545/17	754/26	526/15	459/13	2,973/85	709	252,705
5	GD3FVA/P	South Manchester RC	1,261/17	26/8	744/29	224/13	494/11	2,991/78	815	233,298
6	G3GRO/P	Crawley ARC	1,017/22	567/17	338/25	164/15	149/14	2,235/93	532	207,855
7	G4TMI/P	Toucan Group	1,019/18	591/14	621/29	72/3	67/3	2,370/67	609	158,790
8	GM4HEL/P	Helensburgh ARC	369/14	251/15	638/23	312/18	193/11	1,763/79	429	139,277
9	G0FDX/P	Central Lanes ARC	634/15	322/9	300/23	330/14	229/12	1,815/73	434	132,495
10	G3PRC/P	Plymouth RC	497/13	371/9	446/25	290/12	297/9	1,903/68	439	129,404
11	G3YRC/P	Great Yarmouth RC	1,109/17	14/18	333/21	217/16	-	1,803/62	469	111,786
12	G3WOR/P	Worthing & Dist RC	777/17	18/17	348/24	161/12	168/8	1,639/68	409	111,452
13	GM0ADX/P	Kilmarnock & Loudoun	477/10	459/10	401/30	484/11	-	1,801/61	446	109,861
14	GM4PRO/P	GM4PRO & Friends	329/7	296/7	676/23	355/9	296/9	1,954/55	465	107,470
15	G3MDG/P	Chesham & Dist ARS	407/12	354/9	723/26	173/12	24/4	1,681/63	416	105,903
16	GM3STU/P	West Radio Club	291/7	191/8	514/19	924/18	-	1,920/52	506	99,840
17	G3FKF/P	Salisbury R & ES	934/18	222/9	283/15	133/13	85/2	1,637/55	433	90,035
18	G3GHN/P	Clifton ARS	681/14	264/11	204/22	140/10	67/9	1,356/66	316	89,496
19	GM0CIN/P	IBM ARC	613/10	298/8	240/11	238/8	418/12	1,807/49	449	88,543
20	G6UQ/P	Stockport RS	679/15	50/17	234/18	146/10	58/4	1,624/54	399	87,696
21	GM4SUF/P	-	448/10	203/8	421/17	111/6	388/14	1,571/55	416	86,405
22	G4FOX/P	Melton Mowbray ARS	190/9	137/6	294/23	372/17	146/11	1,139/66	282	75,174
23	GU3HFN/P	Guernsey ARS	114/5	97/5	515/20	32/7	488/16	1,246/53	360	66,038
24	G3KUE/P	Preston ARS	579/10	263/7	13/15	294/11	21/9	1,481/42	348	62,202
25	GM4URZ/P	Loch Lomond ARC	617/12	134/5	311/12	40/6	135/3	1,606/38	345	61,026
26	G3SRC/P	Surrey Radio Contact Club	500/12	35/4	173/17	212/15	107/7	1,027/55	282	56,465
27	G4WEY/P	-	428/15	57/3	193/18	158/8	136/7	972/51	257	49,572
28	G4GCT/P	North Bristol ARC	360/8	322/7	209/14	120/6	51/5	1,062/40	266	42,480
29	G4UCR/P	-	91/6	23/19	173/12	146/9	9/19	732/45	158	32,940
30	G6HH/P	Hastings Electronic RS	249/7	20/2	75/10	159/12	15/2	518/33	129	17,094
31	G6HCI/P	Coulsdon RS	247/7	22/2	267/15	2/1	-	538/25	120	13,450
32	G4XOM/P	-	-	-	465/12	-	-	465/12	114	5,580

"Very enjoyable contest, conditions very good, didn't seem many clubs active. 7MHz let us down"—G3FYO.

"Some problems with the generator, FT102 and wire antennas ensured our final score was below expectations—but it's great fun"—GD3AHD.

"With due respect to Denmark—what a varied bunch of suffixes, everyone a booby trap and they couldn't always remember if they were /P" —GW4CC.

"We enjoyed the facility of our newly acquired tea/coffee urn. Once again our generator broke down but only off the air 20 mins"—G4IRC.

"Our serial numbers 340 to 349 were sent twice, sorry about this, the operator concerned has been given some beads to practice with"—G3SFG.

"Good time had by all—back again next year"—G4HSF.

"We found the hf bands reasonably productive and for once we have a 28MHz log that doesn't look too bad"—G3NWR.

"This was our first attempt at SSB FD and we thoroughly enjoyed the event, we shall be making this an annual event from now on"—GM4TMS.

Equipment used by the leading stations

G3WAS:	TS940, TL922, TH6, delta loops for 3·5 and 7MHz.
G4MBC:	TL930, TL922, TH6, dipoles for 3·5 and 7MHz.
GM5VG:	TS930, FL2100, 3-el Yagi, delta loops for 3·5 and 7MHz.
G0AAA:	TS930, 270ft centre-fed.
GD3RFH:	TS830, 80m loop.
G3NJA:	TS530, W3DZZ antenna.

Operators of the leading stations

G3WAS:	G3KDB, G3LNS, G3NAS, G3NLY.
G4MBC:	G4BWP, G4GIR, G5LP.
GM5VG:	GM3AXX, GM3NEO, GM3NIG, GM3UTQ, GM4KBR, GM4LFA, GM4YMA.
G0AAA:	G3SXW, G3TXF, GW3WVG.
GD3RFH:	GD1GHK, GD4BEG, GD4MCR, GD4MNS, GD4OEA, GD4PTV, GD4WBY.
G3NJA:	G3LHJ, G4EDG, G4ELZ, G4VPM.

Multipliers worked on each band

OPEN SECTION

3·5MHz		7MHz		14MHz	
G3WAS	30	G4MBC	26	G3WAS	58
G3FYO	29	GW4NZ	24	G4MBC	
GM0BRS	28	G3WAS	21	GM5VG	57
G4MBC	23	G3FYO	16	G4AAX	
G8JC		G3ASR	15	G3FYO	46
G4HSF	21			G8JC	44
GW4EZW				GW4EZW	40
G4ADM	20				

21MHz		28MHz		All bands	
G4MBC	40	GM4AGG	22	G4MBC	165
G4IRC	36	GW4CC		G3WAS	161
GM4AGG	33	G3WAS	20	GM4AGG	121
G3WAS	32	G4MBC		G3FTQ	
GM0BRS		G4HRS	18	GM5VG	117
GW4CC	23	G3NWR		G4HRS	112
G3ASR		GM5VG	17		
		G3SFG			
		GI3XRQ	16		

RESTRICTED SECTION

3·5MHz		7MHz		14MHz	
G0AAA	23	G0AAA	21	G0AAA	39
G3NJA	22	GM4TOO	17	GD3RFH	32
G3GRO		G3GRO		G3NJA	30
G4TMI	18	GM4HEL	15	GM0ADX	
G3FKF		GD3RFH	14	GD3FVA	29
GD3FVA		G4TMI		G4TM1	
G3YRC	17	G3NJA	11	GM4TOO	26
G3WOR		G3GHN		G3MDG	
GD3RFH	16				

21MHz		28MHz		All bands	
G0AAA	26	GD3RFH	18	G0AAA	128
G3NJA		G0AAA	17	G3NJA	108
GD3RFH	24	G3NJA		GD3RFH	104
GM3STU	18	GU3HFN	15	G3GRO	93
G4FOX	17	G3GRO	14	GM4TOO	85
GM4HEL	16	GM4SUF			
G3YRC		GM4TOO	13		

Second 1·8MHz Contest 1986

This contest was won by the almost unprecedented margin of over 100 points by Bob Henderson, G3ZEM. Quite often the winning difference is counted in single figures only, so the winner is to be congratulated on his efforts. Conditions were very good, aided considerably by the fact that there was no QRN or similar noises. Activity was of a high level assisted by the QK contest coinciding with the RSGB event. This did cause some confusion with different forms of report being passed, but almost everybody seemed to cope. Practically all contacts made were with Europe and Asia though one or two stations worked Canada and the USA.

GM4ZRR/A would appear to have every chance of winning the Mailland Trophy with his first leg score of 730, which is a lead of more than 100 points over GM4SID. The entry from overseas was a little disappointing considering the number of European callsigns appearing in the logs. The leading station from overseas is OZ1W with UR2RDJ second, and RA1CW a close third. Check logs were received with thanks from F6EPO, G2BTQ, LA8CE, OK1DKW, RA3QW, UA9CR and UQ2GLW.

BRS20249

UK TRANSMITTING

Posn	Callsign	Valid QSOs	Bonus QSOs	Total points
1	G3ZEM*	225	79	1,069
2	GW4IOI* (op GW3NYY)	204	70	961
3	G3SJJ*	193	74	947
4	G3FXB	190	69	912
5	G3MXJ	183	69	893
6	G4GIR	185	67	888
7	G0FDX (op G4OBK)	174	61	827
8	G3PDL	174	67	826
9	G3TXF	173	60	819
10	G4WON	168	62	814
11	G3KDB	162	65	811
12	G3SXW	160	64	800
13	GM4ZRR/A	152	55	730
14	G3IGW	137	60	711
15	G3SJX	137	60	710
16	G3JKS	139	58	707
17	G4ODV	137	57	696
18	G3XTT	136	55	683
19	G3KKQ	126	55	652
20	G3YEC	125	53	640
21	G4KJD	118	55	629
22	G3TBK	120	52	620
23	G3LZO	119	51	611
24	GM4SID	117	51	606
25	G3XYC	111	46	563
26	G3NKS	102	50	555
27	G3SWH	105	46	545
28	G4OGB	106	44	538
29	GM3NCS/P	105	44	535
30	G5MY	90	51	525
31	G3OLB	95	46	515
32	G4IUZ	91	45	498
33	G3BPM	79	46	467
34	G2MJ	98	46	486
35	GM3UIM	80	45	465
36	GW3JI	78	43	448
37	G4ARI	77	40	430
38	G4WYG/A	72	42	426
39	G3MCX	71	40	413
40	G4AAW	66	42	408
41	G3LHJ	65	40	395
42	G4BUO	63	40	389
43	G3YLC	66	38	386
44	G3VYI	66	36	378
45	G3AWR	52	35	331
46	G3ILO	52	33	321
47	G4OOS	47	34	311
48	G3ZRZ	51	31	308
49	GM3CFS	46	32	298
50	G4UZN	48	30	294
51	G4KKZ	48	29	269
52	G3GMM	43	31	264
53	G3FVW	42	26	256
54	G4JSN	26	22	188
55	G4NFX	26	17	162
56	G2HLU	20	17	145
57	G4EBK	20	13	125

Note: Apparent differences in the final scores are due to point loss incurred by unmarked duplicate contacts and incorrect reception of reports.

* Certificate winners

UK RECEIVING

Posn	Callsign	Valid QSOs	Bonus QSOs	Total points
1	BRS 1066	85	42	460
2	BRS 52866	84	40	447

OVERSEAS TRANSMITTING

Posn	Callsign	Valid QSOs	Bonus QSOs	Total points
1	OZ1W*	65	38	385
2	UR2RDJ*	60	31	334
3	RA1CW*	54	34	331
4	DL2HBX*	57	31	326
5	F5OF*	56	30	318
6	DK9NH	47	31	296
7	HB9AGA*	48	27	279
8	LA2UA*	42	29	270
9	SP1PEA*	46	26	268
10	OK1DRO*	42	28	266
11	HB9DFY	43	27	263
12	OL1BLN	42	26	255
13	DL1ZO	39	27	252
14	PA3AMA*	42	23	241
15	UB5WAL*	36	23	223
16	F9BB	35	22	216
17	HB9DDZ	35	21	209
18	OL5BPH	29	23	202
19	OL6BNB	32	21	201
20	HA8UB*	35	19	200
21	RT5UY	31	22	199
22	F8TM	28	19	178
23	UC2SF*	26	19	173
24	G6ZY/EA6*	27	18	170
25	SP2ZDX	24	19	167
26	DL1SN	21	15	138
27	UA9AJX	20	15	133
28	EA7DMF	17	15	125
29	OK3MB	16	13	113
30	UA9CBO	17	11	106
31	OZ1HUE	15	10	98
32	OE1TKW	12	12	96
33	RA6AUV	12	10	86
34	OZ1JNR	12	8	76
35	HB9DDY	9	9	71
36	OL6BNW	9	6	57
37	OK2PZZ	8	6	54
38	RB5IOV	3	3	23

Ropoco 1 1987 rules

1. The general rules for RSGB hf contests, published in the "Operating Guide" supplement, *Rad Com* January 1987, will apply.
2. **Eligible entrants.** All paid-up members of the RSGB resident in the British Isles holding a Class A licence. Single-operator entries only.
3. **When.** 0800-1000gmt, Sunday 5 April 1987.
4. **Contacts.** CW in the 3·5MHz band only. Entrants are requested to confine their operations to 3,510-3,590kHz. Send RST for the first contact, plus entrant's own postal code; for the second and subsequent contacts, the postal code received in the previous contact. Contacts with European stations will not count for points.
5. **Scoring.** 10 points per contact.
6. **Entries.** Logs must be sent to: J Bazley, Brooklands, Ullenhall, Solihull, Warks B95 5NW, postmarked not later than Monday 20 April 1987.
7. **Awards.** Certificates will be awarded to the first, second and third placed entrants.

70MHz Fixed Station Contest results

This year's contest showed a slightly increased entry over the 1985 event, despite a decrease in the number of active stations.

The conditions are best described in the entrants own words, "Bad/abysmal/terrible etc"—G4ZAP, "Poor—the best dx says it all"—G4MHC and "Very poor, almost not worth the effort"—G3WOI. GM0FRT had the only contrary opinion: "Reasonable".

The rules were generally understood by entrants, however some did not claim all the country multipliers they had worked. As this was the first time a 70MHz multiplier contest had been held, the adjudicator corrected any omissions this time only. It should be noted that GJ, GU and GD (had they been activated) are double multipliers counting as both country and county. There are no multipliers for EI counties hence those who claimed "Wicklow" will find their multipliers reduced.

The inclusion of the county multiplier scheme was generally liked by entrants, however the lack of activity in GM and GW did create problems as both GM0FRT and GW4HBK failed to work their own country for a multiplier.

Two entrants asked for a tighter definition of a fixed station in the general rules. This was requested as they considered that some entrants while operating within the wording of the 1986 general rules were not within the spirit of the contest.

Congratulations and certificates to both the winner G4NXO and the runner-up G4RFR.

G4FRE

Posn	Callsign	Points	QSOs	Mults	Cty	Best dx	Km
1	G4NXO	11,628	52	34	HWR	GM0FRT	559
2	G4RFR	10,411	49	29	DOR	GM0FRT	699
3	G4ZAP	9,689	54	33	DYS	GM0FRT	441
4	G3UKV	6,351	41	28	SPE	GM0FRT	482
5	G3WOI	5,936	42	28	BRK	EI2CA	376
6	G3XBY	5,830	44	30	WKS	GM0FRT	533
7	G4MGR	5,224	36	23	MSY	GM0FRT	421
8	EI2CA	4,464	24	16	62WX	G3TCU	425
9	G4MHC	4,416	42	23	HWR	G3VIP	222
10	G4NBS	4,324	28	23	CBE	GM0FRT	555
11	G3VIP	4,260	25	20	HBH	GM0FRT	411
12	G3TCU	4,056	30	23	SRY	EI2CA	425
13	G4FOH	3,386	25	22	CBE	GM0FRT	542
14	G3TCT	3,135	27	19	SRY	G4MGR	294
15	GM0FRT	2,670	14	10	GRN	G4RFR	699
16	G4MUT	1,680	21	16	BRK	EI2CA	397
17	G4ARI	1,425	25	15	LEC	EI2CA	326
18	G3BPM	827	14	13	SOM	G3EDD	254
19	GW4HBK	816	14	12	GWT	G3VIP	298
20	G5UM	666	17	12	LEC	G4MGR	163

Disqualified: G4GFX Rule 3 (incomplete cover sheet) G0CYD Rule 3 (no cover sheet)

70MHz CW Contest 1986 results

Activity was down from previous years—have the 70MHz rigs been converted to 50MHz? High pressure prevailed over the UK but despite this conditions were below average.

GM0FRT's nearest distance contact was 411km away and was reported a consistently strong signal for long periods by many stations. EI2CA was also worked by several Gs. As last year, the leading station was GW4MGR/P operated by G3UVR on behalf of the Wirral & DARC who just kept ahead of G4BVY/P representing the Sheppey Outcasts Contest Group. Congratulations and certificates go to both these stations and to G3UKV as leading fixed station.

G8HHI

Posn	Callsign	Pts	QSOs	Loc	Best dx	Km
1	GW4MGR/P	260	35	IO83JF	GM0FRT	430
2	G4BVY/P	230	33	IO82LB	GM0FRT	559
3	G3UKV	200	32	IO82RR	GM0FRT	482
4	G3VIP	162	19	IO93XN	GM0FRT	411
5	GM0FRT	147	7	IO87WB	GB4MTR	653
6	G3XBY	141	27	IO92DG	GM0FRT	533
7	G3VKM	130	10	JO02TM	GM0FRT	560
8	G3TCU	110	21	IO91OE	GW4MGR/P	287
9	G4ENA	80	18	IO81VR	G3VIP	251
10	G4ARI	44	12	IO92IO	G3TCU	130
11	GW4HBK	32	8	IO81KP	G3VIP	298
12	G3BPM	28	4	IO80OW	GW4MGR/P	245
13	G2DHV	5	5	JO01BK	G3TCU	44

144MHz Low Power and SWL Contest results—errata

There were two errors in the fixed station section due to transcription errors in adjudication. G4WSL should have scored 14,000 points and G6MXL 12,000 points making them 39th and 41st respectively. Apologies to both stations for this error.

144MHz CW and Marconi Memorial Contest results

Conditions for this contest were about average when all entrants views are taken into account, although individual operator reports vary from a little above average to appalling. The weather was exceptionally good for the time of the year.

The level of activity was about the same as for 1985 with many more non-entrant stations active. There was much support for the single-operator 6h section although the other three sections had little support.

This contest was notable for the lack of complaints. G4WFR commented that he heard no poor quality signals whatsoever. GM4CAW/P found conditions improving towards the end of the contest and slightly above average for most of the time. G4VXE/P was troubled by a runaway horse that demolished a mast but in spite of this things went well enough although conditions were flat. Overall the contest was enjoyed in spite of near average conditions.

Certificates go to the winners of each section and all entries for both 6h and 24h sections are being sent to ARI(Italy) for the Marconi Memorial Contest. As in 1985 many of the 6h entrants have done well enough for a good placing in the IARU 24hr contest.

G3FZL

SINGLE-OPERATOR SIX HOURS

Posn	Callsign	Score	QSOs	QTH	Best dx	Km
1	G3XBY	25,987	105	IO92DG	DK0BN/P	709
2	G4WFR	21,822	84	JO01OV	HB9BZA/P	705
3	GM4CAN/P	20,122	48	IO86RW	PA3DCO	732
4	G3OGY	18,400	79	IO91HB	F5DE/P	676
5	LX2GB	17,780	62	JN29WN	DL9LBA/P	642
6	G4ARI	16,239	85	IO92IO	F6HLV	627
7	G4XEN	15,931	75	IO92PH	DK0SM/P	672
8	G4HVC	12,026	63	IO93OA	DK3KD/P	554
9	G3UKV	12,006	55	IO82RR	F6APE	812
10	G3LET	11,957	52	IO90LT	DK8ZB/P	776
11	G4WUS/P	11,860	48	IO94PL	DJ5AR	816
12	G4OTV	11,656	62	JO01AB	DK0BN/P	560
13	G0CLP	11,292	64	IO92KT	ON7CC	810
14	G4EZA	11,071	50	JO01KU	GM4CAN/P	589
15	G3ISL	10,573	36	IO94SH	DA1UM	842
16	G4NSE/P	9,648	48	IO94MJ	ON5FF	490
17	G4ULS	9,170	48	IO81TI	DK3KD/P	853
18	G4YFN	9,162	54	IO91MK	DK2BJ	887
19	G4NBS	8,658	47	JO02AF	GM4CAN/P	549
20	G4DUT	8,226	44	IO92AT	F6GOE/P	544
21	G4BZP/P	6,492	30	IO84KF	PA0NIE	545
22	G4ZVS	6,333	48	IO92BK	GM4CAN/P	502
23	G4HZF/A	6,276	41	IO93VJ	GM4CAN/P	420
24	G5UM	5,061	40	IO92MP	DK3KD/P	578
25	G0ATR	3,503	30	IO92KP	PA3DZL	403
26	G4WVD/P	2,201	8	IO70PM	F5DE/P	441

MULTI-OPERATOR 24 HOURS

Posn	Callsign	Score	QSOs	QTH	Best dx	Km
1	G4NUT/A	53,518	207	IO91OW	DL/I3MEK	876
2	G4UJS	24,489	123	IO83RB	DK3KD/P	679

MULTI-OPERATOR SIX HOURS

Posn	Callsign	Score	QSOs	QTH	Best dx	Km
1	G4VXE/P	27,064	114	IO81XW	DK4DC/P	645
2	G4BLX	18,518	87	IO90WV	GM4CAN/P	689
3	G6QS/P	14,139	61	IO91TF	GM4CAN/P	652

SINGLE-OPERATOR 24 HOURS

Posn	Callsign	Score	QSOs	QTH	Best dx	Km
1	G4AGO	14,939	91	IO91OF	PA0MTE/A	538
2	G4NDG	13,618	63	IO80FV	DK3KD/P	734
3	G4UZN	12,187	57	IO93FU	DK3KD/P	643
4	G3ILO	8,220	41	IO81VO	DK3KD/P	638
5	G2DHV	2,894	31	JO01BK	PA0NIE	276
6	G0EOQ	844	8	IO71XB	GM4YXI	430

10GHz Cumulative Contest rules

0900-2100gmt, 12 April, 10 May, 21 June, 21 July, 9 August, 13 September. Except where modified below all the general rules for vhf/uhf/shf contests contained in the "Operating Guide" supplement to the January 1987 *Rad Com* apply. Entrants unable to be active for three periods are strongly encouraged to send in their logs as a record of their activity, but will not be eligible for an award. Such logs will be recorded in the results. Entries from outside the UK will be accepted, whether or not they are RSGB members. Stations operating from within the UK must state in their logs the national grid reference of all sites used.

There will be three sections: wideband, narrowband and fast scan tv, which will be scored separately. Stations may operate in all sections if they wish. A given station may be contacted three times; once in each mode. In the case of crossmode contacts, the contact should be included in the section appropriate to the equipment used at your end. Serial numbers start at 001 and advance by one for each contact, irrespective of section. A certificate will be awarded to the winner, runner-up, leading foreign station and fixed station in the narrowband and wideband sections and to the leading station in the tv section. In addition, the station submitting the highest scoring entry will receive the Alpha award.

During each activity period, a station may change its location once. For the purposes of this contest the "location" is defined as any point within a 5km radius of a fixed point. Contestants may start from a new location for each activity period. In the event of it being impossible to establish the locator of a site, the QTH should be exchanged.

Contacts will be scored at one point per km. Half points may be claimed by both stations for a crossband contact if two way communication cannot be established on the same band. A full contest exchange should be given on both bands. All crossband contacts must be clearly marked as such in the respective logs.

Entries should be postmarked no later than 28 September 1987. Please do not send in logs until after the last event. All entries and checklogs to: The VHF Contests Committee, c/o D J Robinson, G4FRE, 15 Ferry Lane, Cavendish Park, Felixstowe, Suffolk IP11 8UR.

432MHz CW Contest rules

0900–1300gmt, 5 April 1987

The general rules published in the "Operating Guide" supplement, *Rad Com* January 1987 will apply. Entrants may transmit only A1A (CW) or F1A (FSK) and contact only other stations transmitting these modes. There will be one section for all classes of stations.

All entries and check logs to: VHF Contests Committee, c/o J Pilags G8HHI, 43 Barlons Drive, Yateley, Camberley, Surrey GU17 7DW.

70/144MHz & SWL Contest rules

144MHz 1400–1400gmt, 11/12 April 1987
70MHz 0800–1400gmt, 12 April 1987

This is a new event combining 144MHz and 70MHz contests, and employs a county/country multiplier system on each band (see general rule 14). Full QTH information need not be exchanged on either band. Both individual band tables and overall results will be published. The general rules published in the "Operating Guide" supplement, *Rad Com* January 1987, will apply.

There will be three sections, section S for single-operator stations using the same callsign on both bands, section M for multi-operator stations that may operate on both bands concurrently under different callsigns, and section L for listeners.

All entries and check logs to: VHF Contests Committee, c/o D A Yorke, G4JLG, 40 Edge Fold Road, Worsley, Manchester M28 4OF.

432MHz–24GHz Contest rules

1400–1400gmt, 2/3 May 1987

The general rules published in the "Operating Guide" supplement, *Rad Com* January 1987, will apply. There will be two sections, section S for single-operator stations using the same callsign on all bands, and section M for multi-operator stations which may operate all bands concurrently using different callsigns. Scoring will be by the radial ring system on 432MHz and 1·3GHz, and at 1pt/km on all other bands. Half points may be claimed for crossband contacts. Individual band and overall tables will be published.

All entries and check logs to: VHF Contests Committee, c/o A J Collell, G4NBS, 10 Quince Road, The Limes, Hardwick, Cambridge, CB3 7XJ.

Club News

The following is the latest information received by RRs from RSGB affiliated societies, clubs and groups in time for inclusion in this issue. Basic unchanged information on other affiliated organizations will be published again in July 1987.

RSGB affiliated organizations are requested to report all programmes and new items to their regional representatives regularly. Information for inclusion in the **May** issue should reach them by **5 March** and for the **June** issue by **1 April.**

Club programmes are given in order of date, subject, time and place of meeting. All callsigns of club secretaries and other contacts are QTHR (correct in the current *RSGB Call Book*) unless otherwise stated.

All clubs welcome visitors and would be pleased to hear from potential new members.

REGION 1—RR B Donn, G3XSN, 7 Thurne Way, Liverpool L25 4SQ. Tel 051-722 3644.

Barnoldswick (RRARC G3RR)—4 March (Construction contest), 1 April (Inter-club games night). 8pm start. Morse classes every Monday and shack nights every second and third Wednesday of month. 7.30pm. Rolls-Royce Sports and Social Club. Sec G4ILG, tel 0282 812288.

Fylda (FARS)—3 March ("Aurora, what causes it?", part 1, G2FKZ), 17 ("Modifying a receiver for top band df"), 7 April ("Aurora", part 2), 7.45pm. The Kite Club, Blackpool Airport. Sec G8GG, tel 725717.

Leyland (CLARC G0FDX)—2 March (Noggin and natter), 9 (Committee meeting), 16 ("Aspects of amateur radio", G4TZR), 6 April (tba). Morse classes 7.15pm, G0ASH. Details G4ZYN, tel 0257 452287.

Liverpool (L&DARS G3AHD/G8WCL)—3 March ("Computers", G6KWW), 10 (Face behind the callsign), 17 (Surplus sale), 24 ("History of radio broadcasting", Fr Lennard), 31 ("Radar", G1WFI). 8pm, The Churchill Conservative Club, Church Rd, Liverpool 15. Sec Lynn, tel 051-728 8811.

Macclesfield (M&DARS)—3 March (Construction evening), 10 (History of noise, G0AMU), 17 (Committee meeting), 24 (Open meeting), 7 April (Construction evening). 8pm. The Fermain Club, Oxford Rd, Macclesfield. Sec G1NUS, tel 0625 24534.

Manchester (SMRC)—6 March (Club quiz), 13 ("IC fabrication"), 20 (Surplus equipment sale), 27 (Visit to Manchester Airport or discussion night). 8pm. Sale Moor Community Centre, Norris Rd, Sale. Details G2AKR.

Ormskirk (D&DARC)—5 March ("First aid", Anne Edwards. Contest season planning), 2 April (AGM). 8pm, Ormskirk Community Centre. Details G1KDF, tel 0695 74868.

Penrith (EVRS)—19 March (AGM). Meetings 8pm. Details G4XPO, tel Culgaith 462.

Stockport (SRS)—11 March (tba), 18 (Natter night at the bar), 25 ("KISS", G8UOC). 8pm. The Blossoms Hotel, junction of Bramhall Rd and the A6. Details G4FFW, tel 061 224 7880.

Thornton Cleveleys (TCARS)—2 March ("Astronomy", G3KEN), 9 (Informal/club station on air), 16 (auction), 23 (informal), 30 ("Wartime communication equipment", G4EZM). 7.45pm. Club net every Sunday 11am, G4ATH 1·865MHz. First Norbreck Scout HQ, Carr Rd off Fleetwood Rd, Bispham, Blackpool. Details G4BFH, 0253 852554.

Wirral (WARS)—4 March (Surplus sale), 18 ("TV satellites", G8UZZ), 1 April (Video night). Ivy Farm, Arrowe Park Rd, Birkenhead. Sec G3VEB.

The Northern Amateur Radio Confederation (NARC) is attempting to produce a list of speakers on radio and related subjects for circulation to the member clubs of NARC. Anyone who would like to be included on the list please contact Peter Kirsop, Liaison officer NARC, Peel House, 5 Planetree Rd, Hale, Cheshire, WA15 9JJ, tel 061-980 5173.

I am hoping to see you at the 25th NARSA Amateur Radio and Electronics Exhibition, Belle Vue, Manchester, on Sunday 15 March on the RSGB stand or, preferably, at the bar.

I shall also be visiting the Ainsdale ARC on Monday 30 March. Details G4YYV, tel Southport 79825. *RR1*

REGION 2—RR P R Sheppard G4EJP, 9 Elvington Crescent, Leconfield, Beverley, North Humberside HU17 7LD. Tel: 0401-50397.

Goole (GR&ES, G8HSG)—6 March (Natter night), 13 (Trivia quiz), 20 (Contest discussion evening), 27 (Social evening—Black Swan, Asselby), 29 (Visit to Yorkshire Dales). The Pavilion, West Park. Details G8IOH, tel 0405 69968.

Halifax (H&DARS, G2UG)—17 March (Visit by RR2, G4EJP), The Running Man ph, Pellon Lane. Details G0DLM, tel 0422 202306.

Hornsea (HARC, G4EKT)—4 March (Natter night). The Mill, Alwick Rd. Details G4YTV, tel 0401 62498.

Leconfield (RCTARS, G4GGD)—5 March (Activity night and formal opening of the new shack), 19 (Subs and the year ahead with the secretary). Normandy Barracks. Details G4SMB, tel 0401 51200.

Otley (DARS, G3NXD)—3 March ("Amateur radio on a shoestring", G3RJV). RAOB club. Details G0GAX.

North Wakefield (NWRC, G4NOK)—5 March (Visit/Lecture, RR2 G4EJP). White Horse ph. Details G4RCH, tel 0532 536633.

Pontefract (P&DARS, G3FYO)—5 March (Components fair planning meeting), 12 ("Memories of radio in WW2"). Carleton Community Centre. Details G0AAO, tel 0977 43101.

Spen Valley (SVARS, G3SVC)—5 March ("Public services comms", G4YTE); 19 (Preliminary AGM). 8pm. Old Bank WMC. Details G4PHR, tel 0924 499397.

Todmordan (T&DARS, G4WYT)—2 March (Talk by RNLI). 16 (Chat night). Queen Hotel. Details G1GZB, tel 0706 817572.

Wawna (Wawna Raynet Group, G4UWE)—2 March (County communication testing), 16 (AGM followed by training). EP Section, Meaux Rd. Details G4EJP, tel 0401 50397.

White Rose (WRARS, G3XEP)—4 March (Construction contest), 18 (Rally briefing), 22 (White Rose rally), 25 (Post mortem club rally). Moortown RUFC. Details G4ATZ, tel 0937 842790.

York (YRCA, G4YRC)—10 March (Club video), 24 ("JAS digital comms", G4MWR G1FTA). Ashcroft Hotel. Details G2FTA, tel 0904 704634.

Will secretaries please provide me with contact number and meeting details to allow me to compile a Region 2 directory. Welcome aboard GB4ORH, Operation Raleigh, located in Hull; details from G1TFT, tel 0482 210763. Welcome also to the Rotherham club G0FNR. *RR2*

REGION 3—RR G Ross, G8MWR, 81 Ringwood Highway, Coventry CV2 2GT. Tel 0203 816941.

Coventry (CARS)—6 March (Computer evening), 13, 27 (Night on the air), 20 (Guest speaker). 8pm. Scout HQ, 121 St Nicholas Street, Radford, Coventry. Sec G3UOL, tel 414684.

Evesham (ERAC)—5 March ("Test your spec", GE0GO and G3DEF). Details G4UXC, tel Evesham 831508.

Halesowen (MEB RC)—10 March ("Pacific crossing", G4AAL), 24 (Open meeting). 8pm. MEB Social Club, Mucklow Hill, Halesowen. Sec G4RWH, tel 021-747 8784.

Malvern Hills (MHARC)—10 March (General meeting). 8pm. Red Lion Inn, St Anne's Road, Malvern. Sec G4BVY, tel 06845 66822.

Oswestry (O&DARC)—3 March (Practice night in the hall), 17 ("Wartime experiences", G2WO). 8pm, Gobowen. 8pm. Bell Hotel, Oswestry. Sec GW0DLW, tel 0691 831023.

Shrewsbury (Salop ARS)—5 March (Visit to *Shropshire Star*), 12 (Natter night), 19 (Foxhunt), 26 (HF on the air). 8pm. Old Buck's Head, Frankwell, Shrewsbury. Sec G0EIY, tel 0743 67799.

Stratford-upon-Avon (SuAARC)—9 March ("Home Office Equipment", G4NCE), 23 (AGM and surplus sale). 7.30pm. Baptist Church, Payton Street, Stratford-upon-Avon. Sec G8OVC, tel 750584.

Telford (TARS)—4 March (Committee meeting and night on the air), 11 (WAB awards), 18 (Construction contest), 25 (AGM and night on the air). 8pm. Dawley Bank Community Centre, Dawley, Telford. Sec G0CZD, tel 0952 770568.

Wolverhampton (WARS)—3 March (Transmitter testing), 10 (Activity meeting), 17 (Open forum), 24 (Visit to Sandwell ARC), 31 (Night on the air). 8pm, Electricity Sports Club, St Mark's Road, Chapel Ash, Wolverhampton. Sec K Jenkinson, tel 0902 24870.

Worcester (WARC)—28 March (Contest night). 8pm, Oddfellows Club, New Street, Worcester. Sec G4RBD.

Wythall (WARC)—3 March (Committee meeting), 13 (Rally arrangements), 17 (Packet radio), 24 (Night on the air). Community Centre, Silver Street, Wythall. Sec G4SMA, tel 021-444 2427.

Will all club secretaries please let me have details of club activities for this news column. If you do not send it I cannot use it! Also, please check the last date for input to reach me. *RR3*

REGION 4—RR M Shardlow, G3SZJ, 19 Portreath Drive, Darley Abbey DE3 2BJ. Tel Derby (0332) 556875.

Derby (DADARS)—4 March (Junk sale), 11 (Iba), 18 (AGM), 25 ("Antennas", Lee Mansfield). 7.30pm. 119 Green Lane, Derby. Sec G3KQF, tel Derby 772361.

Leicester (LRS)—2 March (Contest review), 9 (Committee meeting/activity night), 16 (Amplifier workshop), 23 (Lecture, G4GVC), 30 (Test equipment evening). 8pm. Gilroes Cottage, Groby Road, Leicester. Sec G4PDZ, tel Leicester 871086.

Mansfield (MARS)—5 March (Iba), 17 (Antenna tuning). 8pm. Victoria Social Club, Mansfield. Sec G4AAH.

Melton Mowbray (MMARS)—20 March (Antenna evening). 7.30pm. St Johns Ambulance Hall, Asfordby Hill, Melton Mowbray. Sec G4NVK, tel Melton Mowbray 63369.

Spalding (SDARC)—March meeting ("Satellites", G4CUO). 7.30pm, The Ship Albion, Albion Street, Spalding. Sec G4NBR.

Worksop (WARS)—10 March (Magazine bring and buy sale), 24 (Video night). 8pm, Woodhouse Inn, Woodend, Rhodesia, Worksop. Sec G4ZUN, tel Worksop 486614.

REGION 5—RR J S Allen, G3DQT, 77 Rosslyn Crescent, Lufon LU3 2AT. Tel 0582 508515 or at work on 0582 21151.

Bedford (B&DARC)—5 March ("HF wire antennas", G4MEW), 19 (Contest group meeting). 8pm, Allen's Club, Hurst Grove, Queens Park, Bedford.

Cambridge (CUWS)—2 March (Speaker meeting). 8.30pm. Seminar Rooms 2 and 3, Trinity Hall College. Sec G6OQA.

Milton Keynes (MK&DARS)—9 March (Famous American scientists, USAF Chicksands). Sec G0ERE, tel 0234 50629.

Nene Valley (NVRC)—4 March ("Bee keeping", A Waring), 18 ("DXpedition to St Pierre and Miquelon", tape/slides). Prince of Wales ph, Well Street, Finedon, Northants. Sec G6UWS, tel 0933 71189.

Northampton (NRC)—5 March ("Antennas", G3KLV), 7/8 (VHF/UHF contest), 19 (RSGB video). 8pm. Kingsthorpe Community Centre. Sec G8EUX, tel 0327 51716.

Shelford (S&DARS)—5 March (Claude's old club films), 12, 19 (Iba), 26 ("Navigation under sail", G4YRF). Sec G4PSO, tel Hilchin 57946.

Hastings (HERC)—18 March (AGM), 15 April (Junk auction). 7.30pm, West Hill Community Centre, Croll Road, Hastings. Details G4NVQ, tel Hastings 520608.

Herne Bay (East Kent RS)—5 March ("Satellite tv", Dr Geoff MacDonald). 7.30pm. Cabin Youth Centre, Kings Road, Herne Bay. Details G4RIS, tel Whitstable 262042.

Horsham (HARC)—5 March (Spring junk sale). 7.30pm. Guide Hall, Denne Road, Horsham. New Sec G4UDU, tel Hassocks 5517.

Maidstone (MYMCAARS)—6 March (Junk sale), 13, 27 (Natter night with RAE and cw), 20 ("Soldering techniques"). 8pm. YMCA Sportscentre, Melrose Close, Maidstone. Details G0BUW, tel 0622 30544.

Sittingbourne (Swale ARC)—Every Monday (RAE and cw classes). 7.30pm. Ivy Leaf Club, Dover Street, Sittingbourne. Details G1JQH, tel Minster 876091.

Worthing (W&DARC)—4, 18 March (Ragchew evening), 11 (Construction contest evening), 20 (WADARC annual dinner, Iba), 25 (Junk sale). 7.30pm. Lancing Parish Hall, South Street, Lancing. Details G4SWH, WADARC, PO Box 599, Worthing, BN14 7TT.

REGION 6—RR N P Taylor, G4HLX, 87 Hunters Field, Stanford In the Vale, Faringdon, Oxon SN7 8ND. Tel 03677 503.

High Wycombe (Chiltern ARC)—25 March ("British Telecom Maritime Radio Service", Angus Vickery). 8pm. Sir William Ramsay School, Rose Ave, Hazelmere. Details G4XVP, tel 0494 35275.

Maidenhead (M&DARS)—5 March (Meet your regional rep), 17 (AGM), 7.30pm, Red Cross Hall, The Crescent, Maidenhead. Sec G8RYW.

Oxford (O&DARS)—11 March (Natter night), 25 (Iba). 7:45pm. Oxford Civil Service Sports Association Club, Govt Buildings (entrance through gates marked "Driving Tests"), Marston Rd, Oxford. Sec G4PUU.

Slough (Burnham Beeches RC)—2 March (AGM). 8pm, Haymill Community Centre, 112 Burnham Lane, Slough. Details G6EIL, tel Maidenhead 25720.

REGION 7—RR R Sykes, G3NFV, 16 The Ridgeway, Fetcham, Leatherhead, Surrey KT22 9AZ. Tel 0372 372587.

Ashford (Echelford ARS)—9 March ("History of morse", G4FAI), 26 ("Long distance communications", G4CSD). 8pm, The Hall, St Martins Court, Kingston Crescent, Ashford, Middx. Sec G4VAZ, tel Sunbury 82823.

Cray Valley (CVRS)—5 March (Surplus equipment sale), 19 (Natter night). 8pm. Progress Hall, Admiral Seymour Road, Eltham SE9. Details G3TAA.

Croydon (SRCC)—2 March (Surplus equipment sale), 6 April (AGM). 8pm. TS Terra Nova, 34 The Waldrons, South Croydon, Surrey. Sec G8IYS, tel 01-657 0454.

Crystal Palace (CP&DRS)—21 March ("Application of specialized valves", G2FKZ). 8pm. All Saints Parish Room, Upper Norwood, SE19. Sec G3FZL, tel 01-699 6940.

Sutton and Cheam (S&CRS)—20 March (Construction contest), 28 (Annual dinner). 8pm. Downs Lawn Tennis Club, Holland Avenue, Cheam. Sec G4FKA, tel Epsom 21439.

Thames Valley (TVARTS)—3 March (AGM), 7 April (Surplus sale). 8pm. Thames Dillon Library, Watts Road, Giggs Hill, Thames Dillon. Sec G3ENI.

Wimbledon (W&DRS)—27 March ("Maritime communication by satellite", G0FDZ). 8pm. St Andrews Church Hall, Herbert Road, Wimbledon SW19. Sec G3DWW, tel 01-540 2180.

REGION 8—RR M Elliott, G4VEC, 20 Hayset, Sittingbourne, Kent ME10 4QE. Tel 0795 70132.

Crawley (CARC)—15 March (Visit to Dungeness 'A' power station). Club meets at Crawley Leisure Centre, Haslett Avenue. Details G4IQM, tel Crawley 882461.

Dover (SEKYMCAARC)—4 March (Natter night), 11 (Iba), 18 (Natter night and committee meeting), 25 (Construction night), 1 April (AGM), 8 (Natter night). 8pm. Dover YMCA Godwynehurst, Leyburne Road, Dover. Details John Dobson, tel Dover 211638.

Gillingham (Bredhurst R&TS)—5 March (Homebrewing station test equipment, G3VTT). 8pm. Parkwood Community Centre, Parkwood Green, Rainham, Gillingham. Details G0AMZ, tel Medway 376991.

Eastbourne (Southdown ARS)—2 March (Surplus equipment sale), 6 April ("HF wire antennas and dx" G3DBO). 8pm, Chasely Home, Southcliff, Bolsover Road, Eastbourne. Various activities held on Tuesday and Friday evenings at Hailsham Leisure Centre, Vicarage Lane, Hailsham. Details G4XNL, tel Eastbourne 638653.

REGION 9—RR A H Hammett, Rosehill, Ladock, Truro, Cornwall TR2 4PQ. Tel 0726 882 758.

Axminster (Axe Vale ARC)—5 March (Torbay NFD video, G3LHJ), 3 April (144MHz foxhunt). 7.30pm. The Cavalier, West St, Axminster. Sec G3VW, tel 02974 5282.

Exeter (EARS)—9 March ("Antenna radiation patterns", G3GC). 7.30pm. Club HQ, Community Centre, St Davids Hill, Exeter. Details G3YBK, tel 0392 78 710.

Redruth (CRC)—5 March ("Law and the amateur", G3UUD), 9 ("Disc controllers", G3OGB), 19 (Constructors workshop). 7.30pm, Treleigh Church Hall, off the old Redruth by-pass, Redruth. Details G4ZUI, tel Stithians 860 572.

REGION 10—H Phillips, GW4AKO, 17 Penire Gardens, Grangetown, Cardiff CF1 7QJ. Tel 0222 35648.

Cardiff (CRSGBG)—9 March (Nostalgia evening), 16 (Trip to Culverhouse Cross tv studio). Sec GW0CUM, tel 04463 3212.

Swansea (SARS)—28 March (Coach trip to RSGB National Convention at the NEC Birmingham). Details GW0BBO, tel 0792 818100, or GW4HSH, tel 0792 404422.

REGION 11—RR B H Green, GW2FLZ, 1 Clwyd Court, Tan-y-Bryn Road, Colwyn Bay, Clwyd LL28 4AH. Tel 0492 49288.

Colwyn Bay (Conwy Valley ARC GW6TM)—12 March (Open meeting), 9 April (Lowe Electronics Ltd). 8pm. Green Lawns Hotel, Bay View Rd, Colwyn Bay. Sec GW4KGI, tel 0745 823674.

Deeside (Alyn & DARS)—17 March (Practical night, GW0EHB), 31 (Scuba diving, slides and finds). 8pm. Shotton Social Club, Shotton Lane, Deeside. Sec GW1ILZ.

Welsh Language group—Every Wednesday at 11.15am on 3·750MHz. Net controller GW2HFR.

REGION 13—RR A J Scott, 2 Manderston Grove, Duns, Berwickshire TD11 3PP. Tel 0361 83221.

Border (BARS, GM0BRS)—6, 20 March (Mini lectures, members), 3 April (Iba). 7.30pm. St Johns Hall, Berwick-upon-Tweed. Sec GM1IRN, tel 0289 82491.

Dunfermline (DRS, GM3IDS)—March (Visit to Police HQ DYSART), April (Visit to Mossmorran ethylene plant). Sec GM0DYD, tel 0383 413440.

Glenrothes (G&DARC GM4GRC)—4 March ("Satellites and towers", BT officers), 11 (Activity night), 15 (RSGB film), 18 (Iba), Provost's Land, Leslie, Fife. Sec GM1NTQ, tel 0592 744672.

Scottish Borders Repeater Group (SBRG)—26 April (AGM). Sec GM4BDJ, tel 0541 80018.

REGION 14—RR T G Wylie, GM4FDM, 3 Kings Crescent, Eldersile, Strathclyde PA5 9AB. Tel Johnstone (0505) 22749.

Ayr (AARG)—6 March (Test gear, GM3YDN), 20 (Bring and buy sale). 7.30pm, Community Leisure Centre, 24 Wellington Square, Ayr. Sec GM4CUB, tel Ayr 262496.

Dumfries (D&G REC)—The new secretary is Mr J Young, GM6LYJ.

Dumfries (Maxwelltown ARK)—21 March (Club operating with special prefix GB8PX). The Tam O'Shanter Inn, Queensbury Street, Dumfries. Details GM4NNC.

Glasgow (WOSARS)—6, 20 March (Informal night), 13 ("SSTV", GM3WIL). 7.30pm. 154 Ingram Street, Glasgow. Details GM0EFH.

Motherwell (MLARS)—27 March ("BBC communications and the Commonwealth Games", Bill McDowall). Sec GM1SSA.

Tuesday 16 December saw another keenly fought contest for the 'Bright Sparks Trophy' organized by the Kilmarnock and Loudoun ARC in The Huntsman Inn, Kilmarnock. After a ding dong battle the Stirling and District ARC achieved victory over Kilmarnock while the West of Scotland trailed third and Cunninghamme got the booby prize. Bill Stirling, GM4DGT, of the Stirling club, was presented with the trophy by regional representative Tom Wylie, and all were entertained to a fine buffet by the Kilmarnock club. The event was well supported by members from all the clubs involved and has become an annual event in the Region 14 calendar. *RR14*

REGION 16—RR A Owen, G4HMF, 102 Constable Road, Ipswich, Suffolk. IP4 2XA.

Braintree (B&DARS)—2 March (Iba), 16 (QRP, G3GRT). 8pm. The Community Centre, Victoria Road, (next Bus Station). Braintree. Details G1NBV, tel 0376 44908.

Chelmsford (CARS)—3 March ("Kite antennas", G4YTG), 7.30pm, Marconi College, Arbour Lane, Chelmsford. Details G4KQE, tel 0376 83094.

Colchester (CRA)—5 March ("Data communication", John Allen), 19 ("Facsimille", G8CKW), 2 April ("The art of wokking", G4BCH). 7.30pm. Colchester Institute, Sheepen Road, Colchester, CO3 3LL. Details G3FIJ, tel 0206 851189.

Felixstowe (F&DARS)—9 March (Informal), 23 (AGM). 8pm. The Scout Hut, Bath Road, Felixstowe. Details G4YOC, tel 0473 642595.

Great Yarmouth (GYRS)—12 March (Practical soldering and pcbs), 2 April ("Propagation", G3IOR). 8pm. Drill Hall, York Road, Great Yarmouth. Details G3NHU, tel 0493 721173.

Ipswich (IRC)—11 March (Constructors contest), 25 (tba). 8pm, Rose and Crown ph, Norwich Road, Ipswich. Details G4IFF, tel 0473 44047.
Loughton (L&DARS)—13 March ("Basic ac theory", G8DZH), 27 (Night on the air, G4ONP). 8pm. Debden Community Centre, Loughton Hall, Rectory Lane, Loughton. Details G4FKI.

REGION 17—RR T Emery, Wilverley, Old Lyndhurst Road, Cadnam, Southampton SO4 2NL. Tel 0703 812435.

Basingstoke (BARC)—2 March ("Wireless from the beginning", by G3CBU), 4 April ("EMC", G4IWS). 7.30pm. Forest Ring Community Centre, Sycamore Way, Basingstoke. Sec G1OQV, tel 0256 59664.
Eastleigh (Itchen Valley ARC)—13 March (AGM, "Packet radio", G6DLJ). 7.30pm. The Scout Hut, Brickfield Lane, Chandlers Ford. Club net, Thursday 8.30pm. S21-23 G6IVR. Sec G1IPQ, tel 0703 736784.
Fareham (F&DARC)—11 March (Junk sale), 25 ("Equipment reliability", G0GFD), 4, 18 (Natter nights). 7.30pm. Portchester Community Centre, Portchester, Hants. Sec G3CCB, tel Fareham 288139.
Guernsey (GARS)—6 March ("RF breakthrough", GU3YIZ), 27 (Homebrew competition). 8pm. The Lodge, La Corbinerie, Oberlands, St Martins, Guernsey. Sec GU1PMY, tel 0481 26392.
Horndean (H&DARS)—5 March (Chairman's night), 2 April (Visit to SMC Ltd). 7.30pm. Murchison Hall, London Road, Horndean. Sec G4RLE, tel 0705 755274.
Liphook (Three Counties ARC)—4 March ("EMC", G3AEZ), 18 ("Introduction to packet radio", K8KA), 1 April ("The real hobby", G8VFH). 8pm, The Railway Hotel, Liphook. Sec G0BTU, tel Petersfield 66489.
New Forest Repeater Group (GB3NF)—For information or to join the group and help support the repeater, please contact G6DLJ, tel 0703 847754.
Poole (PARS)—27 March (Introduction to 10GHz microwaves). 7.30pm, Commenders House, Constitution Hill Road, Poole. Sec G4XYX.
Portsdown Hill Repeater Group (GB3PH)—For information or to join the group and help support the repeater, please contact Mr A L G Price, tel 0329 281852.
South Dorset Repeater Group (GB3SD & GB3DP)—For information or to join the group and help support the repeaters, please contact G0EVW, tel 0305 771517.
UK FM Southern Repeater Holding Group (GB3SN)—For information or to join the group and help support the repeater please contact Mrs Jan Steele, tel Fleet 613311.
Waterside (WSWC)—24 March (Junk sale). 7.30pm. Community Centre, Blackfield, Southampton. Sec G0BPA, tel 0703 893937.
Weymouth (SDRS)—3 March (Bring & buy sale), 7 April (AGM). 7.30pm, Civilian Mess, Army Camp, Camp Road, Wyke Regis, Weymouth. Sec G0FIT, tel Dorchester 67596.

I believe the Binstead Club has moved, but have not heard from them. A letter to me costs only 13p! *RR10*

REGION 19—RR R J C Broadbent, G3AAJ, 94 Herongate Road, Wanstead Park, London E12 5EQ. Tel 01-989 6741.

Borehamwood (BEARS)—16 March (AGM). 7.30pm. The Wellington, Theobald Street, Borehamwood, Herts. G0DDJ, tel 01-2207 3609.
Cheshunt (CDARC)—4 March (Natter night). 11 (Junk sale). 18, 25 ("TV uhf relay systems", Fred Lyons). 8pm, Church Rooms, Church Lane, Wormley, Herts. Secs G4VMR and G4VSL, tel evenings 0920-84250. Club net on 144·535MHz, 2000 to 2100. Call G4MGC.
Chiswick (ABCARC)—17 March ("CW by computer"). 7.30pm, Chiswick Town Hall, High Road, Chiswick, London W4. Sec G3GEH, tel 01-992 3778.
Ealing (EADARS)—17 March ("Cable tv systems and equipment", G8MPP). 8pm. The Community Centre, 71A, Northcroft Road, Ealing, W13. Sec A Berg, tel 997 1416.
Edgware (E&DRS)—12 March (SW Herts UHF Group, the new 1·3GHz repeater). 26 ("Propagation", G3SJE). The Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware. Details G4RMD, tel Hatfield 64342. Club net on 3·775MHz at 0915.
Grafton (GRS)—This society is holding a combined around-the-clock special event station in conjunction with the RAFARS and RNARS, 6-8 March 1987 at T S Wizard in N London. Callsign GB2TSW. Bands 3·5, 14, 144MHz cw, fm and ssb. Details G4PSH, tel 267 1000.
Harpenden (HARC)—3 March ("Satellites and the amateur"), 17 (RSGB film). 8pm. The Silver Cup ph, St Albans Road, Harpenden. Details G1BJC, tel 05827 2455.
SW Herts UHF Group—This group maintains GB3HR (RB14), at Stanmore. The group would welcome donations to help maintain this repeater. Details G3CWB.
St Albans (Verulam ARC)—10 March (Activity evening). 24 ("Antennas for small gardens", G3XTT, this is the G3POA Memorial Lecture). 7.45pm, RAFA HQ, New Kent Road, St Albans. Details G Wimpenny, tel St Albans 52003.
Welwyn (WHARC)—2 March (RSGB speaker). 8pm, Lemsford Village Hall, Brockel Road, Welwyn Garden City, Herts. Morse classes on Thursdays. Details K Dunwell, tel 0707 335162.
West Middlesex (WMRG)—This new group meets on the top floor, Royal Star and Garter Home, Richmond, Surrey. Callsigns GB1RSG and GB2RSG. New shack became operational 1 Jan and will be active on Friday evenings. Details G1DDR.
Westminster (Civil Service ARS)—Lunch time natter. GB3CSR operational from Monck St, Westminster, SW1. Station Manager Bob Treacher, tel 01-212 8823. Sec G6IMM, tel 01-698 4437.
Westminster (New Scotland Yard ARS)—Not open to the public, but the club station is active from time to time using G4NSY and G6NSY. Contact the sec, Room 99, New Scotland Yard, Broadway, London, SW1H 0BG for details.

To club secs. If you only send me your dates and times of meetings they will only be printed in the Jan and July issues. This is the RSGB policy not mine. You must have a programme to get copy in this column every month. *RR19*

REGION 20—RR C R Hollister, G4SQO, 34 Ballersby Way, Henbury, Bristol BS10 7SU. Tel 0272 508451.

Bristol (BRSGBG)—30 March ("Aviation and air traffic control", G3HKA), 7.30pm. Small Lecture Theatre, Queens Building, University of Bristol, University Walk, Clifton, Bristol. Details G4SQO, tel 0272 508451.
Bristol (FM TV Group)—Constructing proposed Bristol 1·3GHz tv repeater. Details G4ZDF, tel 0272 699947.
Bristol (NBARC)—6 March (Committee meeting), 13 (Bring and buy sale), 20 (Packet radio demo), 27 (CW activity evening), 27/28 (RSGB Convention at the NEC, trip tba). 7pm, Sell Help Enterprise. 7 Braemar Cres, Northville, Bristol. Details G4YOO, tel 0272 690404.
Bristol (SBARC)—4 March ("Cables and connectors", G4KUO), 11 (1987 contest planning, G4KUO & G0CCA), 18 (Computer activity evening, G4XCB), 25 (VHF activity evening, G4TSS). 7.30pm, Whitchurch Folk House, East Dundry Rd, Whitchurch, Bristol. Details G4RZY, tel 0272 834282.
Cheltenham (CARA)—13 March (Junk sale). 7.30pm. Charlton Kings Library, Cheltenham, Gloucestershire. Details G4VXE, tel 0242 36723.
Gloucester (GARS)—4 March (Ordnance survey talk). 7.30pm. St John Ambulance HQ, 2 Heathfield Rd, Gloucester. Details G6AWT, tel 0452 504515.
Weston-super-Mere (WsMARS)—9 March (Doug Chalmers, on his career with the BBC), 23 (Constructors night). 7.30pm. The Bristol Hotel, Locking Rd, Weston-super-Mare. Details G1DJW, tel 0934 514429.
Yeovil (Y&DARC)—12 March ("Receiver noise figures", G3MYM), 19 ("Oscilloscopes 4", G3GC), 26 (Natter night). 7.30pm. The Recreation Centre, Chilton Grove, Yeovil, Somerset. Details G3GC, tel 0935 75533.

Thanks to both the North Bristol ARC, and the Gloucester ARS for their warm welcome on my recent visits. *RR20*

OBITUARIES

The Society records with regret the deaths of the following radio amateurs:

Mr R R Birchall, GW4GQK
Reg Birchall died on 29 December aged 77. He became licensed after his retirement and was well known among the amateur radio fraternity in North Wales. He was active on 3·5MHz until two years ago when he had to abandon the hobby because of ill-health.

Mr P Collington, G4ITD
Peter Collington died on 1 January 1987 aged 50. He had been a member of East Devon Raynet Group for some years, and was a regular operator on 144MHz in the Honiton area of Devon. His special interest was on hf, being particularly keen on contacts with VK and ZL.

Mr P Middleton, G8WBM
Phil Middleton died in December 1986. For many years he was a keen swl and became an RSGB member in 1980, and had been a member of the Mid-Cheshire ARS since the early 'seventies.

Mr H Oakes, VK2FA
Horace (Horrie) Oakes died on 5 January 1986 aged 86. Born in Bolton, Lancs, he emigrated to Australia in 1918 and was well known in amateur circles in Australia, having served on the WIA SW Council and also the TVI Committee.

Mr S J Parlitt, G0BRT
Selwyn Parlitt died on 2 January 1987 aged 67. He came into amateur radio late in life, but soon established himself on 144MHz, where he had a wide circle of friends, and was a keen member of the North Bristol ARC.

Mr A B Smales, G4WZX
Allred Smales died on 18 October 1986 aged 69. Ex Royal Signals, he was a member of the RSGB, the RSARS, the Leeds & DARS and the RAIBC. He was a keen cw operator and for the past few years he ran a slow morse net on 144MHz.

Also:
Mr G Alford, GI4DOR, on 22 December 1986
Mr T Anderson, RS88469
Dr B E Andrews, G6SWK, in December 1986
Mr F J Brown, G0FLR, on 21 December 1986
Mr N H Brown, G3DRS
Mr W T Cowe, GM0CKR, on 7 May 1986
Mr A C Dine, G1MEN
Mr H Dudley, G4GAZ, on 26 December 1986
Mr T Galls, G3TF, on 19 May 1986
Mr J A Geeson, G4IDI
Mr F J Harris, G2BOF, on 21 November 1986
Mr M Jones, G6RZZ, on 12 December 1986
Mr D Jump, RS34878, on 14 November 1986
Mr G Ogilvie, GM6FD
Mr G A Powell, RS32951
Mr N B Reeves, G3SDY, in December 1986
Mr G R Sanderson, G3DAY, in June 1986
Mr P R Shepherd, G4ECH, on 2 January 1987
Mr C E Spillane, RS1060
Mr J B Staker, G3BTO, in March 1986
Mr G A Steer, RS31801
Mr A Swallow, G1OWA, on 14 October 1986
Mr N E Thornthwaite, G8WLP, on 3 November 1986
Mr F Tilchener, RS53912, on 18 July 1986
Mr J C Torry, G6YTJ, in November 1986
Mr A A Wallers, RS35274, on 27 December 1985
Mr H Watson, G3HTI, on 9 May 1986
Mr P Waugh, G0ATH, on 19 September 1986
Mr E Westmore, G3RXC, on 29 July 1986
Mr B Whawell, G4DLJ
Mr W T Whellall, G3FSY, in March 1986
Mrs A E Whittley, G4ZGT
Mr I J Wilkinson, G3VWO, on 6 October 1986
Mr T W Willetts, G3UGE, on 16 December 1986
Mr L Willoughby, G3FEI, on 6 September 1986
Mr C M Winton, GM6XW, on 1 August 1986
Mr L F Wolsey, RS84739
Mr H R Woodman, G3ORR, on 2 January 1987

Members' Ads

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The current rate is £2.30 for 40 words or less: advertisements containing more than 40 words will cost an additional £2.30 for every additional 40 or less words. Each advertisement must be accompanied by the correct remittance, either as a cheque or postal order made payable to Radio Society of Great Britain.

FOR SALE .....

FT77, 1mmar rondx, 18 months old. Mic, narrow filtar, fm board, ideal mobile or /A rig. 100W model, £410. FDK 750C multimode 1/10W, 11ttlr usrd £210. Both prices are rorr pd. No offrrs. Brian, G40OV, QTHR, tel: 0209 820193.

YAESU FT101ZD MK1, all options flttrd, FV101 vfo, swap for Linn Sondek LP12 or sell, £350. C41YA, QTHR, tel: Sittingbourne 21207, evrnings or w/rnds

FLOPPY 01SK ORIVCS 40 track 48TPI double sided. COC 9409 brand new and boxrd, £45 ea or 2 for £80. Ian, C8DUW, tel: 02993 78693.

HF LINEAR KW 500, 2 spare 813s, £175. Icom 251C multimode, £375. SCM Transmatch with noise bridge, £70. Tushin nuto swr pwr meter, £80. G4MHS, tel: Fnlkestonr 50652.

TR10 1R7800 2m fm mobile, £170. C4DUC, QTHR, tol: 0785 823720.

TESTGEAR, gwo, c/w hb Marconi noise/gen TF1106,£25 Sensitive vvm TF1100, £30. Freq mrter TF1067, £30. Avo valve tester Mk3, £20. Advonce Q mrter T2, £20 Pulsetek pulse/grn 233, £25. Solartron digital voltmrter, £25. Salford sig/gen 5-55MHz, £20. C30IW, QTHR, tel: 051-334 8143.

VINTAGE ZCTAVOX AUTOMATIC RA010. c1930. TRF 2 rf, anode bond detactor, 4-pin valves. Mains rnrrgisrd spkr. Rosrwood cabinet on lrgs, Offers? Parmeko valvr amps. Good basr for home brewing tvtr etc, £12 en. GODLII (Croydon), trl: 01-657 0716 evenings

LINEAR HEATHKIT HA14 nrw 2x572B no psu, vgc, £150 No offers. C3C5C, QTHR, tel: 0707 32883?.

F1101 10P BAND, £190. Datong rf rlipper, £13. C30A8, tel: 021 747 8489.

TV1R MICROWAVE MODULES 432/144R 10W o/p with books £75. Maldol base antenna dual-band 70/2GP NSGP72, ex condx, tested inside only, £20 or both £90. QTH not suitablr for 70cm. C1FXP, QTHR, tel: 01-993 4120, evenings.

TR10 TS130S hf tevr, WARC bands, 200W pep, CW filtor fitted, instruction manual, £445. Shure 444D dual imprdanra desk mic, £45. Both vgr, with orig pkg. Rogers, tol: 045 36 3994.

EUOYSTONE 73D grn/eov rx, has varioblr selrctivity Xtal phasing filtor. 100Hz CW filtrr and xtal rallbrator. Have fitted product detrctor and improvrd BFO. Also internal spkr. vgr, £65. Krn, G4WAS, (Nr Walsall), tel: Bloxwich 475057.

YAESU f1726R with 2m, 70cm boards, gd condx, £850 ono. 2m 2x4ex250 amplifior with psu 400W+ o/p with 2W drivr, £350. Martin, G4XUM, QTHR, tel: 0270 626351.

YAESU FT290R, muTek front-end flttrd, all orig accessorias and pkg. Usrd only as base stn. Also microwavr modules 144/30LS linrar amp, £350. Will split. Both items rx condx and will incl postage and pkg. Roy, GU81GP, Q1NR, tel: 0481 47918.

TR7800 144-146MHz 25W fm. 15-memory chann, priority alrrt, autoscon, front panrl keyboard, rrpeater reverse, digital rradout of tx and rx freq, high or low pwr switch, LED bar indicator, £160. MrCarthy, tel: Ipswich 689982.

MCT 144MHz 14-elr antenna, 2 months old. List £45, asking £35. Buyer collrets. G1UZJ trl: Shorne 3797

COMPLETE 23cm stn, IC-202S, MMT144/1296, Puma translstor linrar 8W, 4x23-ale tonnos, £425. Icom IC-28H, 45W 1m mobilr, quick relrase bracket, boom mic, rrmotr spkr, £360. G6ETA, QTHR, (Chestfield, Kent), tel: 022779 3262, evrnings only please.

TA33 Jnr ant ond AR40 rotator c/w control box, £150. Habens, tel: 0273 552824.

QTH 100' ASL, 8 mllrs north Bournemouth, 40' mast purposr built indoor shack largr workshop, 3 bed drt bungalow, kitchen, bklstroom, ent porch, dg, cavity wall insulation, large secludod easily maintainrd garden, wallrd patio, amplo parking, £55,500, C4EKE, trl: 0202 877945.

MANUALS NCX5 Mk1, £2; rx AR88D, £2; Canadian tx 43Mk2, £2; diagrams RAF tx typr 50, amp type 165, 40p rs. NCX5 balanced modulator mod kit convrrts Mk1 to Mk2, £10. Taylor, La Coudre de Haut, St Prtrrs, Currnsey Cl.

SONY ICF2001 rx 150KHz to 30MHz am/ssb ond fm 76MHz te 108MHz computrr controllrd 6-mem. Mint condx, hardly used, orig box, acerssorirs unused, c/w Sony AC122 psu, £85 ono. Virw Chichestrr or West London. Nobbs, tel: 0243 670564.

LOOK AROUND! Not many about. Unwillingly must sell my pridr and joy, TS930S c/w internal otu, MC60 mic, box, manual, £1200 firm. TR2500 2m fm, £190. ETN3 electronic kryer, £25. WANTED: Narino fm tcvr gd condx. (Abingdon) G4DGG, tel: 0235 20230.

UPGRADE YOUR FT201 to 2m multimodr. F1V901R tvtr profrssionally modified smc, e/w monual leads. Simplex or up/down repeatec shift. Extrndablr to 6m/4m/70 by plug-in units, mains psu, £150. C2TA, QTHR, tel: 01-950 1762.

55TV DRHE tcvr mint condx, £250. G3TRB, QTHR, tel: 0905 775206, evenings.

FOR FREE 17-ele 2m tonna weather beaten. Pleasa phone and collect. G3DVV, QTHR, tel: 073 781 2164.

RADCOMS 1976-1983. "Practical Wireless" 1974-1983. Useful for club? Prrfer intrrrstrd partirs rollect or can deliver locally. Also KW Vrspa tx cw/ssb 50W, £40 ono. C4CC1, QTHR, tel: 0329 833488.

IC202S, £125. FT227, £125. 10GHz w/b fm comp, £75. Pwr motor works to 12GHz, £65. 4rx250B with basr and rhimnry, £25, Various anode blocking caps small blowers etc. G1BKJ, QTHR tel: Grimsby 822371

HEATHKIT HW8, HWA71, headphones, £120. Belcom linrr2, psu, mlr, mobile mount, hole, £95. FM Pye Cambridgr, 2m, mic, psu, £45. All vgc. C4NRP, QTHR tel: Lapworth 2702.

SX200 scanning rx with psu and manual, £120. Trirquipment D33 O/beam 'scope with manual, £50. Advance SG63F sig/gon am/fm 4-230MHz, £30. Cassettr rcdr, mono, with psu, suit romputrr, £9. Video game, £5. G8VPG, QTNR, trl: Saltford 3098 aftrr 5pm.

PHILIPS H1700 vcr, gwo, with 50 asstd cassrttes. Would swap for 2m fm mobile rig, eg FT227, TR7800 or best cash offrr. Mike, C4KFK, 0753 686178, answerphone.

YAESU FT707, FC707 atu, FV707DM; 22A psu; oTI vgc, £550. Accept 2m LCD mobilr or TR2500/TR2600 with accessorles in p/ex and cash adjust. Must be collectod. Interested Speetrum extras etc. Syd, QTHR as C1CZM, (Nr Southampten), trl: Bursirdon 4333. G0EZM.

YAESU FTV 901R tvtr, rx rondx, fitted 2m board, £200 ono or exch for lote model 2m 3/5W handheld trvr r/w acerssorles. G4NKH, QTHR, trl: 0253 62925

10NO 5000C COMMUNICATIONS TERMINAL, HI-rrs SM monitor, amtor, rtty, cw, ASCII rtr, numerous fraturrs, as nrw, few hours use only, any trial, £695. May p/exch for BBC model B plus dual 40/80 drivrs. C4Y1P, QTHR, trl: 0234 766A77 or 750111 extn 2393.

SILENT KEY SALE rx G3KRC. FT277, FL2100B, FT221 BBC-B and much else to be cleared on rxecs instructions. Smith 01-449 7135.

YAESU FT-one used only on rrcolve and not even that past 6 months. Regrrtful salr, £1200 ovno. COOPY, QTHR, tel: 01-529 4657 brtween 7pm-9pm.

IC402, professionally modified, 53030 Casfrt rf stoge etc, £200, 432MHz single 4ex250 linear, works well, and all parts for psu, part built,£150 4ex250,(usrd) and new vhf basr, £15. 1296MHz tvtr, 144MHz IF 2W o/p, £100. 1296MHz preamp, £20. 2 x 2e39A PA and psu, £130. 3off ceramic 7289 valves new, £35 ea. 1.4m dish kit and 1296MHz feed new £50. 2off cx1400 rrlays new, good to 1296MHz, £15 eo. MMC435/600 ATV rvtr, £20. Datong UC1 hf evtr, £50. Carr rxtra. P/rxch ony or all above for FT726R with satrITIta modules, Datong PC1 hf evtr, Datong FL3 filter. C8PPR, QTHR, Bradford, W Yorks. tal: 0274 674396.

ICOM R71 e/w fm unit (rx257), remoto control (RC11) and high gradr 455KHz ssb filtor (fl44R), cost ovrr £1000, £780 ono. AT500 auto otu, £330, AC2S 144MHz and AC3S 432MHz masthead preamps unused, £60 eo. All boxed as new. C8BCC, QTHR, trl: 061 485 6944.

TELEPRINTERS KLEINSCHMIDT TYPE 150 45/50 bds, £20. Crrrd 7E and tape readrr, £15. Mulrhead fax tx/rx 120 ins/min, £35, STC Arlo rx/IF strip 28/30MHz i/p om/lm/ssb, 2m evtr sontinel for above, manuals with all items. C4AU8, 7 Hobiry Close, Bilton, Rugby, tol: 0788 811106.

KLYSTRON KS920B, new and boxed, £10. CRT plus shield DG736 used, £3. 2off YL1080 quick-heat QQV03-10 used, £5 ea. 2of1 Fairchild solid-statr microwave sourcrs 6350-6850MHz, new, £5 ea. C4CED, 32 Prlorsfirld Road, Woolton, Liverpool L25 8IN.

SOMMERKAMP FT2S0 hf tevr, matching psu/spkr, mlr, manual, vgc, £230. Tektronix S41A scope, dual trace ond last rlso plug-ins, manuals, probes, gwo £50. Wayno Kerr sig/grn CTS3 8-300MHz nm gwo, £30. Buyrr collects. CM4XDA, QTHR tel: Bishopton 862875

PF8s 2 available. Xtalled SU19, 2off nleads, ono spare, h/b chrgrs, manuals, gc, £50 ea or £90 pr. Carr free. Cambridge am hiband, controllrr, mic, cables, elrcuit info, gc, £30. Buyer collects pays carr. Carrey, CM4XDA, QTHR, tal: Bishopton 862875.

TR10 155305 as new boxed, manual e/w atu AT230 boxrd, £660. C4U8Q, QTHR, trl: 0924 384021.

YAESU FT-202R 2m fm 6-chann xtal handheld, nleads and casr, £75. B/W vidao camera ex rctv rrron lens £60 MML 144/40 10W i/p 40W o/p linrar with preamp £50. Harry, COOOL, NOT QTHR, (Co Durham) tel: 0388 834270.

YAESU FT780R 10W 70cm multimoda tcvr vgc, £325. 9x19-elr 144/435MHz Oscar antenna, £15, C4GPX, trl: Laneing 753893.

RETIRING 19877 Availablr mid/latr Summer, quirt QTH 450 asl, town 3.5 mllrs, 3-bed, 30' lounge, spiral stair, fitted radio room, full c/h, dble gge, outhousrs, opprox 2 acres, tower prmission, no TVI, at lrast £60K. C3CYC, QTHR.

GOING QRT. Comp stn. FT1Q1ZP, vfo, linear, OBM scopr, kry, otus, LM14, BC348, 60/SA, variable pp, 13.8/3, boxrs asstd components ICs caps, maters eablnrts, txlmrs, blowrrs, eables, rotators, noise bridge, gdo etc, £700. Lot only, see details. G3KPW, QTHR, tel: 0209 717612.

FT77S 10W cw ssb fm, £365. Benrher paddle as nrw, £40. Welz SP1S swr/pwr metrr 2W/20/200 as new, £45 FRDDx400 vgc with spares valve, £120, FLDx400 o/p low hence, £70. Buyer inspects rollects. C4PPG, QTHR, Lanes.

SUPER8 SONY ICF7600D 3 wrrks old romplete. Leather case, mains unit, handbook, rarplace arrial batterirs c/w maintenanre contract, £145. TL922 Trio linear, offrrs? StiTI UR43 rrloys ovollablr. Barnes, G3AOS, 14 Coalpit Lanr, Langley, Macclesfield, tel: 02605 22B7.

ICO4C 70cm handheld still in box, as new with carrying case, £260 ono. Trio TR7800 25W 2m mobilr

comp in box, £160 ono. Versatower 60', gc bet eeeda new wineh ard eablo e/w ground post, £350 ono. G4PKS, QTHR, tel: 0532 826487.

EME (GERMAN) TYPE 1325 13cm 25W valve linear with 7289, ss raw, £230. 1500V pwr supply card with mains HT toroidal and gv heater toroidal, £76. 13cm 3-pole iliter, £38. 13em sleg turer, £23. Perleet. Paul, G4XMF, tel: 0293 515201.

70cm LINEAR 4Cx250 fully protected metered psu as Oct'77 Rad Com 400W i/p, £235. Yaesu FT780 1.6MHz shift mod, £15. Psu 13.8V 6A unboxed 2oil, £15. Psu 5V 60A switch mode, £20. Chris, G4CRF, OTHR, tel: 0582 68446.

TR10 TS530, £475. AT230, £120. VFO230, £100. SP230 £20. TR9130, £375. All vgc boxed with instrs. G4RUS, OTHR, tel: 085 885 343.

THREE WEEKS OLD CD600 rtty ew ASCII tor decoder. Uhl, tv, moritor, printer, use as morse tuter, £190 ono. GW4IUY, tel: Aberdovey 367.

FT730R 70cm 10W tcvr, vgc, boxed with mobile brkt £198. 2m linear 10W i/p 50W o/p, £20. C6GVW, QTHR, tel: 0753 883299.

IRIO IS830S, AI230, both mint condx, little used, boxed with manuals. Kenwood MC-60 desk mic modded lor use with IS830S, £775 the lot. Jaybeam 2m 14-ele parabeam £35. Miko, G4XHO, QTHR, (South Bucks), tel: 08444 3269 after 7.30pm.

EXCHANGE BLAUPUNKT "NEW YORK" radio cassatto system inel 6 spkrs, graphle equaliser, 80W amplifier, superb top quality system cost over £900. Also 9" monitor as new, exchange lor hl linear or any amatour radio equip. G4VHG, QTHR, tel: 0733 231639.

AUTOMATIC OR MANUAL AERIAL TUNER. Ragrot no info. Comprising 2 superb roller coasters, motor driven or manual slowmotor, motor or mreual switched high voltage ilxed matching capaeitors, indicator metor, numerous rolays, £45 carr pd. Cobb, G3UI, QTHR, tal: Halifax 60574.

OFFERS FOR MY SHACK CLEARANCE? Odds sundries 100 boxed valves otc must all go. First sersible offer secures. Ekco A274 vhf im velve teble redio twie spkrs, good offers. Wharledale concrete colume spkr, offers? G3EFK, QTHR, (Croydon) tel: 07375 51212.

STORNO COM734 L/B ctss, £30. Pye MF2SFM L/B, £35. M212 Olympie uhl, £50. Storro COM713 SSCH syrth, £35. Cleartone CH900 uhl, £55. Pye M256 Olympic L/B boot, £30. F30FM L/B, £50. F402FM L/B, £160. PC2, £30. G8EPR, QTHR, tel: Bewdley 403773.

WELZ RS1100 13.8V 11A psu ss new, £45, suits most rigs. Unadilie high pwr treps, £6 pr. 7MHz makes 5-band ae and 14MHz makes 4-band aa, vgc. G3NWG, OIHR, tel: 0245 283520.

AX25 PACKET RADIO THC Z84CM0S processor low pwr, 16KRAM, 8KROM, watchdog circuit, break socket for satellite modems etc, RS232 or TIL to host, £110. G6MGO, OTHR, tel: 0727 23961.

1296MHz-144MHz 1VIR part bullt klt, £50 oro. Trio R1000 ard FR17700 atu, vge, £220 oro. Might split. Trio 9000 2m multimode vgc, £300 ono. Mark, NOT OTHR, (Horseyside), tel: Newton-Le-Willows 5829, anytime.

DAIOHC 070 morse tuter as eew, £36. C4XXI, QTHR, tel: 01-204 5040, after 7pm.

SOLIOISK 32K sideways RAM board lor BBC 'B' e/w 5 disks etc, £30. MM144/28 tvtr, £65. Chris, G4UKF OIHR, tel: 0935 823475.

HOMEBREW LINAMP PAIR 813s QRO 80-10m rack mounted ir lree stsedleg 4' rack c/w Drake 1V3300 LPF, £350. Redlloe R50M rx 95KHz-32MHz mourts lr rack £65. Fritzel FB33 trlbarder 3-ele, £195. Delivery by errangement. Smith, G4AJJ, OIHR.

SCANNER SAIKO 7000 similer Revco RS2000E sells lor £279. 60/89MHz 100/179MHz 380/519MHz am/nblm 70 memories. The scarrar that searches sed stores irto memory automatically 240/12VDC c/w leads, aerial, mobile moeets, herdbook, mirt coedx, £165. G3IES, OTHR, tel: 0272 500742.

YAESU FT757CX, all-mede, all-bards, ger corv receive as rew with orig box and maeuels. incl HH-18H mic. Free delivery UK, £650 oeo. Will take FT707 or FT77 lr p/exeh. Stove, G4WXC. (Lincs) tel: 0476 77708.

PACKET RADIO UNIT AX25, £79. FT-708 70cm fm haedheld, £150. FT230R 25W 2m mobile, £150. Standerd C-58 multimode 2m portable, £160. 25W linear, £40. Travor Tugwell, 3 Westbury Close, Barton-or-Sea. New Milton, Hants. tel: 0202 486344 extr 2223.

23-ELE 70cm HAC Yagi (used four times NFD), £15. Buyer collects, Horshem area. John, G3WZT, tel: 0403 710565 OR Bryn, G3SWC tel: 0403 722444, averings.

TRIO R2000 gor/cov rx e/w Trio VC10 cvtr in ox coedx, e/w manual, orig pkg, £500. BNOS 12A psu, £65. G4LTM, QIHR, tel: 061 338 3787.

ICOM ICS51 6m base multimode sc/dc, £465. Yaesu FT790R 70cm multimode/portable, nicads, case, £285 Iokyo 70cm linear 1-30W, Gaaslet preamp, £105. FT690 6m multimode/portable, ricads, case, £215. Oalwa AF-606K, £55. G4RHI, HOI QIHR, c/o G4MSF, OIHR, tel: 091 4693955.

FT980 litted all lilters. Curtis kayer, mint, unmarked, £950. G3AGT, OIHR, tal: 0823 76349.

OFFERS INVITED: TV cameras Sony HCV3000P, Shibaden FP100 HD tripod (wheels), Shibadan SV6100K video redr, 40 tapes. Creod 444. Anadek DP8000 computer printar. Dragors 32/64 Delta DOS. 2m/15-ele Cuedea arterra. Fortop ATV43S tx/corv. All vge, with spares, mereals. Clayton, tel: 0227 367152.

FT780R 70cm multimodo mobila/boso tcvr, lr mirt condx c/w orig pkg, hardbook ard aceosaaries, £350 WANTED: FT230R or similar 2m lm mobile lr gd condx G4KUR, OIHR, (Birmiegham), tel: 021 704 1236.

FT301S FIIIED CW FILTER, £260. Weltz SP220 swr/pwr rew £55. Adorls bass mic AM303, £25. Old AVO LCR bridge, £10. BBC Model B+ tape redr+ books, £225 IC740 tcvr+ ICPS15 psu+ cw filtor+ markar board, £675. G4RKO, OTHR, tel: 0604 712865, everings.

SX200N SCANNER in lirst class condx, mains cvtr and toleseopic aerisl incl. Carox "S"mator circuit board fitted, meter incl, £180 ono or WHY? Prefor buyer collects. GM0EFC, 28 Stairlie Gres, West Kilbride, Ayrshire, KA23 9BT, tal: 0294 822848.

SHACK CLEARANCE: ICS05 6m t/c enused, boxed, £215 ono. IC3200E dual-baed t/c 2m/70cm with spaach synthesiser, mobile brkt. Usod few minutes only, boxed £325 oro. IC02EMk2 handheld, new model with improved repeator oporation, with crss, spkr/mic, c/cord, spare battory box. Boxed, mint, £196 ono. AR40 rotator with 7-ele Cushcraft 2m beam, control box, cable mast ard wall brkts if required. Syrs old, £50 oro. G4PAR, NOT QTHR. (Bucks), tal: 0525 222163.

AR880 RCA spkr valves vibpack marual good cordx, £50. B41LF mir valves manuals service notes spere valves ssb adaptor ard manual, £40. Will split. WANTED: Eddystone EC10 mains psu. Derek Sheen, C4CCW, OIMR, tel: 01-651 1410.

YAESU FR101 deluxe solid-state rx grn/eov all mode litted 2m lm cvtr, lm liiter, ssb am wide narrow lilters, ex condx, £250. Ron, tel: St Albans 61291 after 6pm.

FLEXIBLE SHAFTS: 10.5", 7.5", m/f ends, 0.25", £2 ea. AVO valve date manual 8th ed, £4.50. Valve 6AY lor LM14, £2.50. 100/1000 KC/S dual xtal 3-plr, rew lor Class "D" w/m ete, £3. 1mA meter, 2.5", £2.50. G3MBL, QIHR, tel: 0284 60984.

YAESU FT290R+ multek, crrrying case, 35W linear, 9-ele lonna. The lot, £295. May split 19-ele 70cm met, £10. All vge, Carl, GOFYC, tel: Cambridge 63684.

FT101B vgc with lm cvtr, ler, mic, dust cover, spare new valves, manual, £300 or p/exch lor FT7 or FT7B or vhl multimode. G4MH mirlbeam, £30. C4SYI, tel: 01-958 9868, alter 6pm.

ICOM IC-735 hl tcvr 160-10m ssb, cw, am, lm, plus superb gc rx now, £750. Corsider p/exch IC-720A, FT707. Roekdale TR12E tv satellite rx, £175. Echostar LNB, £160. G4AFY, tel: Kiddermlester 747480.

KW VESPA hl tx with matchleg KW201 rx 160m-10m, £180. HR0500 gar/eov rx ell solid-state, needs slight attertloe, £50. Kenpro KT200EE 2m fully syrthesised handheld with eccessrrias, £150. Stuart GOBES, tel: 0962 883066.

ICOM 720 hf tcvr with gar/cov rx, ex condx, mle, hardbook, orig boxed plus h/brow 20A psu, £550. Irio TH21E 2m hendheld ricad helical boxed, £150. C4PYN, QIHR, tel: 0761 414067 alter 6pm.

IC120, 23cm fm tevr, vgc e/w mobile mount, £325 ono. May take gc 2m or 70cm hendheld ir p/exeh. Keith, G6MSI, NOT OTHR. tel: 0772 653835, after 6pm.

RARE BRITISH WARTIME vhf commurleation rx R308, 19-145MHz, serial ro 50, gwo, marual. Swap px R216 rx or sell, £50. Buyer collects. WANTED: Cossor 343 gargirg oscillator. G8LIU, OTHR, tel:0895 30006.

FRG8800 FRT7700 FRV8800 150Kc-30MHz 118-174MHz am ssb cw fm 12-mem clock matchirg Yaese headphoros, mlet cordx c/w haedbook, orig pkg, £490, save £300 JAP 34ce 2-stroke petrol erglre with handbooks, £25. G3CGQ, OIHR, tel: 0582 25519.

YAESU FT101ZD lm MK3 desk/mic spare am board, £475 FTV901R 2m tvtr, £200. FV901DM vlo, £100. SP901 spkr, £30. FRG7700 rx, £225. Telereader CWR610 c/w rtty Prince green moritor, £175. All in ex condx. Oon, G0AFM, tel: 0227 721400.

ORT SALE: FT290R as new, incl case, rleads, rhgr, helical, £225. Metching Alirco 30W Amp, £25. FT730R, £150. All with orig pkg ard manuals. AR40 rotator, £40. Also 2m/70cm beams plus misc bits eed plocos. G8CJL, OIHR, tel: 0473 213939.

TR10 TR2200GX tevr, as new, £70. Icom IC22A vgc, £75, both with xtals for all cherr. PET 2001-8 micro with built-ir cassatte ard loads of soltware £100 ono. G4DMP, NOI QTHR, tel: Leeds 860439.

YAESU FRG7 digital readout w/m as new, £125 ono. UHF vswr mtr 400-1.2GHz new, £40 ono. SWP 1002 vswr mtr 3.5-144MHz new £15. Shack lar heater 240V a/c blower/heat 1&2, new £15. Cassette redr mains/ batt as new, £10. Digital alarm clock eew, £10. Zolf ext spkr, £5 ea. Creod mod 70 tel/prieter, set 50 baud vgc, £7. Buyer to collect. Yaesu baso/ mic Y0148 new, £20. Tho lot £225, will split, or oxch for FRG7000 lor prolarerce. G1AVE, OTHR.

FT290R WITH SOFT CASE, mobile mount, chgr and a rew set of rleads £230. Sommerkamp SX2699R, FT2700 dual barder, 9 mtha old, £360. Homes HC280 80m tvtr, £25. G4OBX, OTHR, tel: 0270 71369.

EDDYSTONE 670A rx rice cordx, £70. BSA Bantam 1954 motorcycle, swap lor arything radio, no rubbish pleasa. WANTED: SH220 stn monitor with BSB adaptor must bo mint cordx. J P Wright, 12 Horn Hill, Basingstoke, Hants RG21 2HD, tel: Basingstoke 468649.

YAESU FT209RH HANDHELD extra batt pack NC1S quick chgr, Vox unit mobile brkt, prriect wkg ordor, £245 oeo. Michael, GOCDD, tel: 01-958 8516/1164.

ICOM IC202S c/w manual, mic, case, vgc, £120. Belcom LS20XE, 2m, hand portable, c/w ricads, chgr helical, soft ceso, synthesized, vgc, £80. C4BHQ, Hampshire, tel: Cosport 586577.

MML70/100 4m linear amp, £95. 6m "Heor" tvtr c/w spare ceso, £25. 4m "Heor" type tvtr 10W o/p tx needs allgring, £30. VHF wavemetor 65-230MHz, £5. G4TIF, OIHR, tel: 0926 313669.

FT101ZD 6-band vgc rew valves, mic, marual, inspectioe invited, £395 oro. G4HOF, OTHR, Bristol area, tal: 0454 415768.

MICROWAVE MODULES MTV435, £125. MMC435/600, £20. MMT144/28, £100. MML144/40, £35. Alinco 30A psu £75, 6A psu, £20. Pye B W camera end monitor, £50 Honda EX500E generator, £175. Welz SP300, £50. Tenne portable mast, £15. Buyer collects. C8HPO, OTHR, tel: 058 283 3307, after 6.30pm.

CROMEMCO PROFESSIONAL S100 competor. 5" drives, 64k RAM, 22-slot 19" lrame, vdu, software, £250. Second system, £150. Juki 6100 Daisy printer, £195 12-slot S100 frame, £35. Vero 6-slot with psu, £75 Buyer collects. Thomas, tel: Cardill 552830.

TR10 IS130S ssb and cw lilters remote vlo aed SP120 spkr, all as new c/w boxes ard manuals, £525 3-ele mirl beam, £65. Postage extra. G4YRR, OIHR, tel: 0782 395017.

SUPER SMALL UR43 coax relays 12V up to 460MHz, £3.50 plus postage. Sony ICF7600D, 2 hrs use, comp evee mairterance contract, £145. Barnes, G3AOS, 14 Coalpit Lane, Langley, Macclesfield SK11 0DQ, tel: 0260S 2287.

SHACK CLEAROUT: Yaesu FR67 vgc, £100. Horda generator 12/24V 250W vgc, £100. Txfmrs 15V 10A twice, £15. 0-14-20V 20A, £15. Various other items sae for list. WANTED: 6m board for FTV901R. G4IDF, QIHR, tel: 0905 351568, eveniras.

F1690R c/w Spectrum 20W linear amp and preamp, £250. All vgc. Park Air 360 channel air band moritor, vgc, £125. G4VEW, OIHR, tel: Kidsgrove 5070.

YAESU FL2100Z, mint, £520. G4SHS, NOT OIHR, tel: Redditch 45158.

WEATHER SATELLITE SIN: Timestep leterlace 2.0 Eprom for BBC Revco RS2000 seeariRg rx modified to leclude satellites full documertatior (see G3RDC HRI October 1985), £325. Also FT221R multek fully xtalled, £325. G4HHF, OTHR, tel: Ipswich 51319, anytime.

SINCLAIR SPECTRUM PLUS 128k, datacorder aed programs for Scrabble, word praeessor, office master. Timire board ard program for fax, £120 oeo GOCHK, OTHR, tel: Chichester 779479.

MORSE TUTOR, Detorg, £35. R115S elreult irfo, 60 pages, £4.50 iec post. WANTED: Thorr Tx9 tv chaasis ard servlea manual, bey or copy, advice or elusive Tx9 psu feelt Halicrafter "Sky Chemploe"

rx circuit. Taylor, G4EBT, 01HR, tel: 0709 370021, after 6pm.

PSUs: STILL LOTS LEFT but only at 40A, adj volts 10-14 fully protected, £69. Also some s/m units at 100A adj volts 10-14 fully protected, £75. All testcd, g'teed wkg all units. Will post. G4XOX, tel: 0245 324555.

TS940S atu, £1550, TL922, £890, Tokyo HC200, £260, Kenpo KP100, £110, ex condx lyr old. GOCED, 01HR, tel: 01-349 9556, after 8pm.

YAESU FRDX400 rx, £85 ono. Aerial rotator (Archer) £12. Shiboden colour vtr, £85. Sanyo B/W vtr, £85. Sony umatic video player, offers? G8ETO, tel: Swindon 641988.

SINCLAIR QL. Sinclair 12" colour monitor, Gigasoft mousa, EASE window software, supercharge basic compiler, Psion 3D chess, parallel printer i/face, 10 blank disks, books, £285 ono.

JST100 hf tcvr with cw filter fitted plus matching p/sup and spkr, vgc, £875 ono. Consider Trio TS670 with BC band, 15120V or p/cov rx in p/exch. Jaybeam 6-ele 2m quad, £20. Carr extra. G3GHB, QTHR, tel: Inkberrow 792582.

MAST - CLARK SCAN. Telescopic 40' max pneumatic with electric pump. Gd condx. £295 ono. G4PPE tel: 01-977 6122, daytime.

FT230R 25W fm tcvr, gd condx, £190. Mizuho 2m 1W ssb portable tcvr, £50. Derek, GOEYX, 01HR, tel: 0785 52289.

KW 2000B hf tcvr with mains psu, handbook, mic, stabilizing mods fitted. In ragular use, £200. Buyer collects or pays corr. GW4CFC, 01HR, tel: 0248 712944.

RECENCY HX2000 HANDHELD SCANNER, nicads, chgr, helical and external aerial adaptor, case, vhf low high, aircraft, uhf, am/fm all bands, 20-mem, scan and search, new price £279, as new £179. Bargain! G0OSK, 01HR, tel: Sandwich (Kent) 617775.

WS62 WITH 12V PSU, £60. WANTED for spares: Sony SLG7 video rcdr, any condx, plus any diagrams or servicing info for this machine. Will collect. G0OSK, QTHR, tel: Sandwich (Kent) 617775.

TRIO R600 gen/cov rx fitted fm demodulator board vgc, £205. Admiralty handbook of WT 1938 vols 1 and 2, £5 ea, carr extra. CDEBV, N01 01HR, tel: 0385 886057.

HU1EK CFBA 144o masthead proamp, ex condx, only 3 mths use, £110. No offers or would exch for FT290 in ex condx with cash adjust. GDEOU, OTHR, tel: 0386 858829.

BREAKING FOR SPARES two CR100/2, 898 dial, £8. Teak amplifier TL25 plus with variscope preamp, £15. Goldring GL70 record deck, £10. Datong UC/1 up-cvtr, £40. G3OWY, OTHR, tel: 0244 381051, evenings.

WAVEMETER TYPE R502, pre-war, 100KHz to 48MHz, vgc c/w coso, charts and circuits. They don't make them like this anymore! Offers? John, G3ZIU, tel: Horsham 51544, evenings.

YAESU FT200 hl tcvr 80-10m c/w FP200 psu and base mic xtal for 10m cw fitted, ideal for new licensee can be seen wkg all in vgc, £200 ono. Ron, GOBOW, OTHR, tel: 02837 8485

KENPRO rotator KR600RC, just been completely overhauled by Bredhurst, £120 ono. Buyer collects. Ken, GBGEA, OTHR, tel: 0342 311475.

HAL OS-2000 K5R rtty/cw/ASCII terminal keyboard system, vgc, £125. 2X81 c/w gd keyboard, software, books plus 16k, £25. MMT28/144 tvtr, £70. Trio 7200G 2m mobile c/w bkt and mic, £75 ovno. Carr extra. G3OJI, 01HR, tel: Ware 4316.

24' (2/12') 6" square lattice tower very strong but needs attention, £20. Creed 444 with stand and 3 rolls of paper, £20. Realistic OX300 rx, £65. Welz SP300 swr/pwr meter new in box, £80. GA5EA, 01NR, tel: Hampton-in-Arden 2624.

1R10 1V50 6m tvtr direct plug-in accessory for TS520 tcvrs or will work with any rig covering 28-30Mcs. Self powered, handbook, no mods, FB condx, £105 ono. G3CRH, OTHR, tel: 05436 6364, evenings or 08894 5151 extn 358, daytime.

TRIO TS940S + N60 mic, 8 mths old, £1,500. Trio TS9130, lyr old, little used, £380 ovno. GOFGP. tel: Oxford 52615, after 8pm.

ICOM 2E HANDHELD, case, chgr, as new, £130. Hammerlund HQ180 timer manual vgc, £120, Eddystone 1400 solid-state gen/cov rx, mint, £125. Low SX30, £75, Mk2 Barlow Wadley, £65. Bill, G4EMG, tel: 01-553 7308 daytime, or 01-534 3460, evenings

TS530S with 250Hz and 500Hz filters plus VFO240 and AT230, £615. Maintenance manual for Creed model 75 teleprinter, £5. G3NKS, tel: Cheltenham 41099.

2m 100W LINEAR WITH PREAMP, on large heat sink, £80. 13.8V 13A fully protected psu, £40. 0-30V 20A variable supply, £50. 2m H/B synthesized fm tcvr almost finished project, £40 ono. Chris, G4CRF, 01HR, tel: 0582 68446.

TWO CASES FOR HALF-HEIGHT DISK DRIVES with all leads for 1EAC to BBC, 1 with mains psu, 1 without Both as new, £15 and £5 each respectively. Watford Zilf socket as new, £8.50. Post extra. Paul, tel: 0843 61448.

OPERATE HF AND UHF WITH YOUR 2m RIG! WPO communications tvtr o/p 10/15/20m, £95 ono. SSB products TV144-432 70cm tvtr, £65 ono. 12V 6A regulated psu ex-computer, £25 ono. Valves 6BA6(4) 6BH8(2) 6BL8 12AU7 6BE6 6826, 6A28, £1 ea. G4YBU. tel: 01-393 9691.

P40 VERSATOWER BASEPLATE groundpost breaking winch Jaybeam 5Y/2m HQ1 minibeam rotor CD/45/11, all 2yrs old, £550. Buyer collects. G3DUF, 01HR, tel: 0297 52823.

G3CCZ SILENT KEY SALE: Yaesu FL101, FR101, FL2100 YD101, Trio TS780, ELBEX cctv gear, monitor EXM917 cameras(2), switcher EXS945, ICS AM1-1, Spectrum Fastext80 printer, numerous accessories. Test gear swr bridge, t/rcdrs, keyers, otus Datong processor ASP filter FL3, IG21XT, duplexers, attenuators, filters, tv-tx IGT488, psus, mics, IF2700 bridge, monitor Philips Type-80, KW109, DL600 dummy load, Western 70tv 432MHz tvtr, dozens other items. SAE full list G3LKZ, 'Kildonan', Steam Mill Road, Bradfield, Manningtree, Essex. Tel: 01-242 4433 extn 4302 (office) or 0206 396352, evenings.

AIRBAND MONITOR FDK SKY VOICE ATC-720 professional case. External aerial adaptor, as new, £120 ono. G3YBH, tel: Burgess Hill 3851.

UNIOEN 2030 2m mobile, £80. Trio HC60 mic, £37 or swap Yaesu MD1BH desk/mic. Homes AP3 speech processor board (assembled), £5. G62YG tel: Rushden 318493.

1R10 TS520 tcvr mains or 12V, £275, Icom 701 tcvr 701PS, £395, Atlas 210X tcvr 12V, £375, CRHI rtty monitor and audio scope, £20. All vgc. Can deliver reasonable distance. G3NZT, 01HR (Cheshire), tel: Bunbury 260323

SWL GLOBAL ATU, 1986 inter call book, country zone list, confidential freq list (UK), Towards RAE, amateurs world atlas, pw passport to amateur radio RAE manual 11th ed, air traffic radio, great circle dix map. Nato, tel: 0228 35177, after 6pm.

PYE A200 linear, £35. W30AM, £12. R401, £40. Gd sig/gen, £100. Olympic high band, £35. Low band, £55. Mod meter, £75. WANTED: VHF Multimode base, hi tcvr, Bird Thruline. See Wanted ad for further details. G3XOA, QTHR, tel: 0775 66533.

N01 minibeam, balun, Stolle rotator, £95. 20'x2" foldover mast, £25. Trap dipole, balun, insulators £25. G3UZI, 01HR, tel: Horsham 66327.

MARCONI TF1041B vtvm, £15. Other items of test equip, txfmrs, tv distribution cable 75ohm, tubular feeder 300ohm. SAE list valves? State your needs. G3CBU, QTHR, tel: 0256 58921.

W&D 70cm SYNTH tx/rx 7 boards completed. Tested and aligned by W&D. Total cost to me has been £196 Lack of time to complete project. All info incl in sale, £145. G8ESK, QTHR, tel: 0274 497438.

ICOM ICR70 rx as new. Used only few times. Boxed, c/w antenna coupler which cost £80. Together new price over £850. Asking price £490 or near. Howard tel: 0394 460 474.

FT290R, nicads, chgr, case, mic, 12 mths old, £230 FT101B, fan, £290. Shura 444D base/mic, £30. FC757 auto atu, mint, £230. MK706 key/marble base, £10. Going ORT. G1UUO, tel: 01-854 5745.

ORAE 24 amp pwr supply, as new, £95. Daiwa 500W atu model CNW 419, 20W and 200W range. Gross needle metering of forward and reflected pwr. Ex condx, £135 ono. Phil, tel: Gravesend 64224, any time.

TONNA 144MHz 4-way phasing harness N-type connectors, only used indoors, £25.
WANTED: Circuit diagram for Codar AT5. Programs for NEC PC8201A. WHY? G4GYO, QTHR, tel: Watford 30355.

TRIO TS130S 100W solid-state hf, vgc, plus HC355 mic with matching vfo-120, brand new boxed, £450. Yaesu MH1B8 scanning mic, brand new boxed, £14. Trio LF30A LP filter, brand new boxed, £20. GMOBVG QTHR, tel: 057 63 615 or 057 63 494.

FT101Z fmmoc condx, little used, £400. Also FT707 vgc, super mobile rig, £300. Both rigs WARC bands, mic etc. G40BB, QTHR, tel: Oxford 61866, anytime.

ICOM IC271E base stn with manual and orig pkg, as new, £585. Orogon 32k computer, £35. Moving QTH forces sale. G4YRL, 01HR, tel: 0326 573617.

MICROWAVE MODULES 144/100L5, 1W-3W i/p, 100W o/p, built-in preamp, 6 mths old, little use, £100. G1510, 01HR (Chessington) tel: 01-391 0450.

WORD PROCESSOR XEROX 850: Full page screen display daisy wheel printer, various printwheels, 140 A4 pages per floppy disk. Swap radio gear, rxs, musical instruments etc. WHY? Computer grade 100,000 mf capacitors 15V, £2 ea. G4XWD. tel: Kidderminster 3674, evenings.

KW2000B hf tcvr ssb/cw matching psu and KW4B vfo recent new 6146 o/p valves etc, £200 complete. Prefer buyer inspects and collects. GOEJH, 01HR, tel: Nottingham 279457.

HF ANTENNAS FOR ALL LOCATIONS, £4. "Secrets of ham radio dxing", £4. CW filter FT10120, £15. G20YM matching unit balun, £15. 40m trops pair unused, £8. Cirkit CDD, £20. Aluminium mast 10m extended, £15. G4ICP, NOT 01HR, tel: 0376 84478, evenings.

1R10 1H401A 70cm mobile, £220. Also 10m monoband 3-ele Yagi and 5-band vertical with 1R4P radials. Offers? G4011, QTNR, tel: 0472 813450.

DRAKE 7-line, 1R7A+P57 tcvr, TR7+PS7 tcvr, RV75 dig.vio, L7E 2k linear, HH2700 atu, SP75 s/proc, 7077 d/mic, all as new boxed. Also brand new unused, R7A rx, SP75 s/proc, WH7 w/mator. Hufton please phone 0602 609345, anytime.

YAESU FRS08 amateur bands rx. Property of deceased swl, £50 ono. Buyer inspects and collects. G3SWH, 01HR, tel: 0934 832736.

YAESU FT902DM, £550. Matching FC902 atu, £125. Tvtr FTV901R 2m module fitted, £185. FV901 ext.vio £135. FL2100B linear 1200W, £350. 40A psu, £95. Versatower P40 c/w post winches head unit, £250. 4-ele quad 10m Avanti, £85. G4XRR, OTHNR, tel: 0305 777312.

AR88, £30. KW E-zee match, £45. Marconiphone model 4246 reel-to-reel tape rcdr, £10. VSWR bridge hf, £5. Hultibend trap dipole, £15. G4FYJ, OTHR, tel: 01-733 7417.

LARGE ANTENNA ROTOR PROP pitch type 01RO, £35. Must collect. HF module for FT726R 15m-10m as new, £200. Also looking for defunct hf linears for parts. WHY? G4OWP, 01HR, tel: 0638 751830.

FT77 tcvr 100W plus mobile brkt, used only twice, £385, Clark (Heor Lode), tel: Widegates 432.

YAESU FRG7700 rx plus FR17700 plus FRV7700, £250. Trio 2400 handheld, 2 sets nicods, 2 antennas, leather case, £110. John, G4POW, tel: Crimsby 70125.

EXCHANGE immaculate FT101ZD Mk3 9-bands im fan etc unused on tx for hf mobile tcvr, any considered. Cash adjust or sell, £480. Philips FM321 70cm fm tcvr 433.000 to 436.000 6W o/p. Exchange WHY? or sell, £125. ICSAMT2 with software for CBM-64. The Ideal Amtor rtty cw ASCII unit, £190 ono. Owner emigrating so need to condense stn. Give me o ring and haggle, all possibilities considered. G6MHV (Merseyside) tel: 051 327 5804, anytime.

APPLE EUROPLUS, twin disk, 64k, monitor, basic Pascal software, £400. Will not split. Exchange TS120/130, used ss sd 5.25 floppy disks, £5 for disks. IC2AI USA version IC2, £80. Mizuho MX2 2m ssb, £40. G3PJT, 01HR, tel: 022 026 3137.

BOOMLESS QUAD SPIDER c/w f/glass sprooders, £45. Welz coax switch new, £15. 1AU 4-1 balun, £10. Weden 5V filament tximr, £5. Anedo blocking caps 500PF 5kV, £2.50. G4SGV, 01HR, tel: Redditch, Worcs 45304.

ICOM IC271E 25W multimode base stn, mulek front-end, 32-mem immaculate, £700. NAG 2m linear 250W o/p, £250. Microwave modules 70cm linear 100W £150. 70cm 19-ele crossed Tonna, brand new, never assembled, £30. G8KPO, OTHR, tel: 0298 79481.

YAESU FT102, mint condx, am/fm fitted matching spkr, only used for swl, £560 ovno. Ken, tel: 0256 460849, after 6pm.

TRIO TR9000 all mode 2m tcvr, never used mobile, also AR10XL rotator, Joybeam 8Y2M and Cushcraft Ringo Ranger antennas, all in ex condx. Comp 2m stn, £350 ono. Would consider splitting. GOCOF, OTHR, tel: Woking 66397.

ICOM 735 with pwr supply, mint condx, £770 ono. Icom 3200 dual-band 1m mobile with dual-band antenna, £420 ono. Comp rtty stn, BBC B, sideways ROM incl rtty, monitor, quality printer, terminal, console, valued £900, £600 ono. Taylor, tel: 0227 276004.

YAESU FT2700RH dual-band mobile. As new, few hours use only, £375. G8CCO, QTHR, tel: 051-521 5539.

TOOO+ RECORDS, ALL SINGLES, approx 1958 to 1983. Would prefer to sell as one lot. For list send sae to G4RON, 4 Burrs Nurseries, Old Wootton Road, Kings Lynn, PE30 3BG. NOTE! Check first on phone: 0553 675676.

ALTRON TOWER slimline double box section, base/wall mounted, tiltover with rotator cage for support to aerial mast. Max height 30'. Prefer purchaser to inspect and arrange removal, £180 ovno. Brian, G4RWO, QTHR (Stafford), tel: 0785 71 4963.

ALTRON CM35 slimline telescopic tiltover mast. 3-section tubular steel. Fitted RH1 rotorhead drilled to accept Kenpro KR600RC/KR400RC. Extends to over 40' with stubmast. Ex condx, less than 1yr old, £200 ono. Kenpro KR400RC, £95 ono. Buyer inspects/collects. G4RKO, QTHR, tel: Newbury 60263

50MHz 1WTR KIT PW Heon c/w diecast case ready drilled labelled and painted. Also Spectrum 25W linear assembled and dc tested, The Lot £65 incl 1st class postage. G3OPR, QTHR, tel: Kemble 574.

HF RX REALISTIC 160 dx, £50. Academy 13.8V 3A psu, £10. Roberts, tel: Ooolside 822798.

SCANNER RX AR-2002, 25-500 800-1300MHz. Mag-mount and antenna for scannor, £400. Jack, GOFOH, QTHR, tel: Leyland 434014.

DIAMOND CP4 4-band vert antenno 10-40m with tropped radials, new boxed, present price, £149. Will accept, £70. Buyer collects or pays carr. C4MAO, OIHR Antwrp 1986 callbook, tel: 0865 718430

MICROVITEC 14" colour monitor, £130, 12" B&W monitor, £30, ASCII keyboard incl console, £15, AFS keyor module (AK-1), £10, BBC and vg (TRSDO) software/hardware, SSAE lists, RAMS, ROMS and dig ICs. Enquire TE318 teleprinter FOC. C4CVZ, OTHR, tel: 051 220 5470.

COMMODORE 128 COMPUTER with 1570 disk drive and 20+ progs or disk, £275. Kenwood Trio 830S with remote vfo 230 with memories, £725. G3ZYQ, OTHR, tel: 01-363 3363.

VHF/UHF SCANNER PRO2003 programmable memory, 60-chanr, 20,000 frog between 68-512MHz, as new in orig box, £158. Philips world rx 9-mem am/fm/ssb/cw direct entry keypad 146-29999KHz im 87.5-108MHz batt/mains, £146. G4UHH, OTHR, tel: 0983 402273.

STABILISED PSU 13.8V 3A, £9, hand/mic 50k ohms ptt £5, new casad computer keyboard, £8, OX60B handbook, £2, HW101 handbook, £5, Heath CD396 2k ohms phonas, £2, 3cm burglor alarm unit, £8, 0.25W 2m magnetic mount, £5. Shaw, tel: Swindon 750130.

KW 2000A, pwr supply, KW103 swr meter, £140. Advance TC9B 50MHz frag counter, timer, £40. Single paddle morse key, £18. Thermionic valve tester mercury model 990 (110V), £15. TISV pwr supply for above, £10. G4KZI, HOT OIHR, tel: 0983 296791.

SX200 SCANNER, £200. Transcendent 2000 music synth £100. Harconi TF8010 10-470MHz sig/gen, £60. Airmec 858 0-30MHz sig/gen, £25. 2N3055 5 for £1. Jackson CB04 20pF variable caps, £1 ea. Equip carrying case 7x11x13, £10. Mechanical run-back timer, £3. G4BXT, tel: 0322 77401.

YAESU FT209R handheld with HC15 base ch/psu, NMT2 sp/mic and PA3 car adaptar. Orig boxes and instrs, £235. Dave, G4RSR, OIHR, tel: Yateley 873792.

FRG9600 Mk2 fb cond, £330. 15700G + mnTek praamp fb cond, £325. Both are owner from new. Delivery extra at cost. G8FSX, OIHR, tel: 0274 497438.

FT290R c/w nicads, chgr, orig pkg, no mods, vgc, £220 or exch P1X, AR2001 or AR2002. Going QRT on 2. Mr I Raybould, 9 Upper Albert Road, Shelfield, S8 9HR.

FT102 vg, £500 ovno. G0AF5, QTHR, tel: 0276 32930.

KW108 MONITORSCOPE, mint condx, £70. Belcom Liner2 £35. CBM2001 computer 40k c/w monitor, cassette rdr, CBM4023 tractor printer, compathwr dual disk drive, software on tape and disk, manuals and books, £415 ono. Nick Grundy, G4HXV, tel: Gatclorth 703, between 6pm-9pm.

ANTENNAS FOR SATELLITES 430MHz helical Sandpiper kit new, never used, £25. Jaybeam BXY RHC harness, as new, £25. Wood Douglas 430MHz ATV rx cvtr kit built unboxed untested, £15. GM4FDM, tel: Johnstone (Renfrew) 22749.

SHACK CLEARANCE: Multimeters, psus, valves, Eddystone 888 and other numerous items. Property of recently deceased G3, hence untested. Prefer disposal as one lot. Individual items checked and sold separately if required. On behalf of the sold separately if required. On behalf of the bereaved, G8WTB, QTHR, tel: 0279 34471.

ANTENNA SPECIALISTS 70cm and 2m aerials hatchback mounts, £15 ea. Trio HA4000 aerial magmount and diplexer, £35. SMC duoT-band aerial and diplexer, £20. Trio boom mic, £25. Trio TW4000 dualband txr £320 ono. G6IWC, OIHR, tel: 0753 49880.

YAESU FT480 2m multimode 10W, vgc, used very little, gd audio, £295. WANTED: Heil BM10 boom h/set Datong AHF notch filter Holl EQ200 or 300 Shure 444 mic. Evans, tel: 0952 815983.

STANDARD C7800 70cm 1m 13.8V 10W 70MHz coverage, £165. MM 432/144R tvtr, £95. MM 432/28 tvtr, £90. Shimra CP80 dot matrix printer, Centronics 1/face, BBC micro and Epson compatible, £140. ATI items in gd condx. G3WCS, NOT OTHR, tel: 0606 891913.

FILTATOWER TELESCOPIC 45' with rotator and TB3 3-ele triborder, less than 1yr old, £400 ono. Ex wkg condx. G0BMP. OIHR, tel: Exeter 75861.

IWO 2m 9-ELE TONNAS with matching feeder, £30. 2off 2m 16-ele ZLs, £18 eo. Will consider swaps. WANTED: HF mirlbeam slr camera. WHY! G3RYY, OTHR, tel: Chorley 62250.

IR2400 hardheld 2m. Extras incl spare nicads carrying case, 0.25 wave telescopic and chgr, £140 ono. Consider p/exch with TR9000 TR9130 plus my cash adjust. Dave, G1HVP, QTHR, tel: Crewe 25757B.

YAESU FT707 hl tcvr, mic, manual, vgc, £345 or exch for TS430S FT757GX with cash adjust. G4ZUE, OIHR, tel: 0203 346819.

SSTV ROBOT 70A slow scan tv monitor, complete monitoring unit. Connects into rx loudspkr lead to display pictures on built-in screen. Ex condx, with manual, £115. T Lorgo, G4CYZ, NOT OTHR, Captains Farehouse, Street, Hassocks, Sussex. Tel: 0273 890830.

YAESU FT757GX BNOS 12/25A psu, both as new, £800 ono. GOCIX, OTHR, tel: 0843 69250.

WOOD AND DOUGLAS 2m synthesiser kit, all boards assembled but not tested. Case mic and switches incl, £100. Also pwr amp 100mW i/p, 30W o/p, £50 ono. Hicol, tel: Watford 37229.

YAESU FT790R 70cm multimode nicads chgr, immac, £300 ono. 5-olo 50MHz Tonna, £30. PW meon 50MHz tvtr, £35. Spencer, tel: Hallsworth (Glos) 3411.

QOIHC QRT ON HF. Comp KW2000B (x2) stn, accessories and spares for £350. Suitable for keen amateur. Lots of new and used radio/tv valves. Oilers? G4AOV, QTHR, tel: 0533 552809.

ANADEX DP8000 printer, 112cps, ser/par, 3k buffer, incl operator/service manuals, £70. Buyer collect. Clip-on ammeter, 0-300A, 0-600V, 9 ranges, c/w leads/pouch, £30. Service manuals FRG9600, £6. AOR2001, £10. WANTED: Circuit diag IC240. G8PYC, OTHR, tel: 0844 21 5857.

COLLINS SLINE 325-3 75S-3B S16F-2 psu incl spkr, c/w all service manuals, mint condx and in 1st class wkg order. Will not separate, soon wkg at my QTH and will deliver reasonable distance. GW4ZXC, OIHR, tel: 0656 3585.

IC3200E dual-band 2&70cm 1yr old, mint, £350. IC2E with sparo nicad and mobile psu, £150. New Jon'B6. FDK700E 2M25WFM little used, vgc, £120. Buyer inspects and collects. G0BYC, OTHR, tel: Worthing 506289.

YAESU FRG7 rx 0.5-30MHz, £100. Microwave modules advance morse trainer MMS2, £120. GM0CNM, formerly BRS87180, 4 Grange Road, Kinloss, Nr Forres, Grampian, Scotland IV36 0XP

6m BEAMS BY JAYBEAM, 2-ele 75ohm, new £12. VHF rotator new, £45. Hygain 10/11m 3-ele beam, £40. Freq counter/timer by Advance Instruments TC4A, £50 with matching freq divider TCD 500, £30. (These cost hundreds). CB type freq counter, £35. WANTED: Swap or p/exch any of above for: Quality vswr meter hl to 150MHz, 200W. Yaesu FT102 tcvr, Yaesu FP707 psu. BarTow Wadley XCR30 for spares. HD dummy load. G6CPH, tel: Ilkley 600737.

AR2002, vgc, £345 ovno. Lockwood, G3XLL, OTHR, tel: Hellis 596.

YAESU YM36 noise cancelling mic, £10. Heathkit RG1 communication rx, £30. 1pr 80m traps LAR, £12. Txlmr 240V i/p 19.5V o/p. OK TOA T2V psu, £10. Nigel, G4HRR, tel: 021 744 8672.

AEA HORSE COACH CARTRIDGE for Commodore 64, £20. Datong morse tutor, £35. Details for morse coach upon request. Dave, GM1VOL, QTHR, tel: 0224 734794 after 6pm.

YAESU FT230R 2m 25W mobile, immac condx, manual boxed, £180. G0BDJ, QTHR (Devon), tel: 06267 6259.

AR40 ROTATOR c/w controller leads, manual vgc, £60 G3NJU, OTHR, tel: 067 747 7965 evenings or 0565 53799 daytime.

TR10 TS-120S, Atro, mobile mount and mic, £360. KW160 ogu, £40. Caravan 10' ideal for shack or contest, £120. G3XXN, tel: 0909 732113 or 730128

EDDYSTONE 770R vhf rx, £80. Heathkit SB310 hl rx, £70. Codar CR70 Mk2 gen/cov rx, £30. Dalwo SR9 2m im rx, £30. Microwave modules cvtrs 2m, £20, 70cm £22. ATV, £25, Eddystone FC10 cannibalised, £5. G8JBD, tel: 0502 60420.

YAESU FC707/Sommerkamp FC767 aerial tuner/swr, mint condx, £85 ovno, QTHR, tel: Pershore 554516.

1R10 TS130S with VF0120. Fxch for Yaesu FT77 plus cash adjust or FT107m, or any tx/rx with top band considered. G4TYW, QTHR, tel: 070 687 3935, evenings or w/ends.

YAESU FT77 hl tcvr with 1m fitted and mobile mounting brkt, £350, SEM tranzmatch atn, £50. 20A pins psn, £45. Buyer collects or pay carr. G4WXN, NO1 QTHR, tel: Wymondham Norfolk 607068, after 6pm

TR9130 MULTIMODE, Pilmoth, PS30 psu, 144/100 linear/preamp, Dalwa swr/pwr, 30' tele mast, arterro collinear, very little used, ex condx, £600 Buyer collects. Edith, G4VVE, 14 Large Square, Stainforth, Nr Doncaster, S Yorks DN7 5RL.

HF COMMS rx R600 vgc, £180. Eddystone EC10 modified lets works well, £35. Jektronix 515A scope works, £30. Offers considered. All items Unwtr, GOFMT, 17 Carlton Rise, Melbourn, Royston, Herts SG8 6BZ, tel: 0763 612115.

FT209RH mint condx, boxed with FNB4 batt pack (5W) NC-9C chgr, YH-2 headset, MMB-21 mobile brkt, £230 ono, or would consider exch for FT290R, cash adjust either way depending on cordx. G0D2U, OTHR, tel: 07948 286.

C11 STH: C11, C11 ssb, R210, LS57, acpsu tx/rx, acpsu rx, 24V psu, atu, Jbox, leads, inlo, £325. C13 Stn: C13, 12Vpsu, Jbox, loads, inlo, £120, Auto atu, 30-70MHz, 50W/50ohms 24V, £60, Creed 444 +STS, £60, acpsu with 2xHT, 2xLT o/ps, all variable/metered, £45. 12V/10A regulated psu, £40. HF ssb tx/rx, ssb1251 +acpsu, £45, Rodlior GR410 +12V psu, £40, Labgear LSM100P,£35. 15520 cw filter YC-339SC, £25. Pye amlol rx wkg 120.5, £20 American Navy WW2 vhl tx/rx CRT43007, £20, army wideband vertical AE 36-60MHz, £20, Pye Towband am rx, OK/4m etc, £5. 24V/2A regulated psu, £8, Hallard QQV03-25, £10. R115S for spares, £10. T2V/2A rechrgble batts £2, 88mH Toroids, £1ea. Please collect heavier items. Martin, G4HCE, OIHR, tel: 021 357 6139.

YAESU FT209R, FNB3, Vox mic/headset, NC15 base chgr, PA3 car adaptor and MMB21. All mint, cost over £400, accept £275. G6GUL, OTHR, tel: 0602 894547.

2m BEAM 12-ele 2L, £10. 10m half wave vertical Alcom, £10. Buyer collects. G4RSY, OIHR, (Croydon) tel: 01-651 0633.

FT101ZD 1m fan cw filter, one of the last models, £450. FL2100Z 9-band linear, £500. AR40 rotator c/w controller 30m lead £60. Walz 400W dummy load £30. SEM wavemeter 1.3 to 30MHz, £25. WPO morse memory keyer, £40. 2off 2-way coax sockets, £10 ea 4 sections UR67 average 15m long, 40p per metre. All items boxed and with manuals. Rick, tel: 01-405 6233 days or 0206 210710 evenings.

FT101Z 9-band: filtod narrow cw filter, 1m board 12V dc-dc cvtr. Also FV101Z external vfo; FC902 atu, mic, spare mains load etc, £550. (I'm now 100% DRP). Buyer inspects, collects, demo line. G4LOF, OTHR (Birmingham), tel: 021-426 3663.

YAESU FT2700RH dual-band radio ex condx, £355. Would consider p/exch WHY? Centron hl linear 1000B ex cordx, £300. 4off 6L06 valves, £16. Johnny, tel: 0427 5266.

YAESU FT227R 2m 1m tcvr, £120. Trio PS20, £40. BO9 base unit, £35. SP120 spkr, £10. Iruvox tape rdr, STS retty terminal. 10-ele 2m Yagi. Class D wavemeter. AVO LCR bridge. Box new 7" tapes. Oilers? G4RKO, OTHR, tel: 0604 712865 evenings.

FT726R 2m pTus 77cm module etc, £850. 70cm gaslet preamp, £50. 2m proamp, £15. 19-ale Tonno, £25. 2m antenna 16-ale, £20. Dalwa meters GH410M 3,5-150MHz, £25, CN460 140-450MHz, £30. All as new G3KDH, QTHR, tel: Highcliffe 72768.

RADCOMS AND RSGB BULLETINS. Due to a bulk purchase I have a number of duplicates from 1952 to 1980. £3 per year. Proceeds to RAIBC. Buyer collects. G6JNS, QTHR, tel: 0905 620041 anytime.

AR88D, £5, out of use for 12yrs. Complete. Needs attention, buyer collects. G3PYM, QTHR, tel: 069 177 3686.

ICOM 290D m/mode 2m 5W-25W, £375. Icom 5H8 desk/mlr, £35. Icom 245E m/mode 2m, £195. SEM Sentinel 2m linear o/p = 4x l/p max 50W prramp, £30. G10VC, QTHR, tel: 01-843 0191.

ELECTRONIC MEGGER NEW, £63. Hallicrafters 527 S36A £55 ea, gd rondx. ARB80 wkg, £30. Valve voltmeters testsets SD5(B)U KentM22, £20 ea. LCR bridge trstset 373A, £30. 150W D load, £12. Polished slate desk/mlr stands, £10. Jarkson, tel: Kirkby Cumbria 022 989 635.

FT910DM am/lm/cw ssb wwv jjy memory Fisk operating sarvice manual vgc, ac dc, also atu and diamond antenna DPCP5 vgc. The lot £300 ovno. Willlord, tel: Plymouth 261269.

TR7930 MINT CONDX WITH BRKT plus mobiles, acrials and mountings, £235. SHC 8A dc pwr supply RS12-0B10, £40. Buycr collects. Cmer reasing mobile operation. G3MTX, O1HR, tel: 0273 351B7.

WANTED••••••••••

YAESU FT208R c/w nicads, rase, hellral and spkr/mlr, £150. Yaesr FT708R c/w nicads, case and hclical, £140 or tha lot lor £275. Buyer collect or pay rarr. Peter Martin, G4SDK, (Birmingham) tel: 021 429 7141, olfice hours.

TOP BAND am tx, compact as possible. WHY1 G3JIC, O1MR, tel: 0744 23916.

3-ELE TRIBANDER KR400 rotator. CODTP, O1MR, tel: 0272 206609.

FOR HEWLETT PACKARD pwr meter 4318 (CT49S):- thermistor mornt type 478A, thermistor mornt rable attentuator 20dB; adaptor roaxlal to wavegride. Coaxial diode Elmac 2-01C for Harconl IF1041 valve voltmeter. Dlll James, G6XM, 56 Fern Meadow, Okehampton, Devon, EX20 1P8.

MURPHY TYPE 618 tx (AP100333) and pwr unit (AP100336). Aerial plug am type 161 (10H/184). Marconi rx pwr units type 889A or 966A with plugs and cables. G4FUY, QTHR, tel: Reading 733633.

144MHz VALVE LINEAR ANP with psu 4cx250, 4cx350 HAC Oressler etr. Reasonable price. G10XF, O1HR, tel: 08045 3646.

MANUALS COPY, BUY, lorr Q-meter Sanwell Mutton type 4S. AC Voltm Lavell TM28. Telegr distorsion scope A1&E-rx. Wireless Canadian No9Mk1. B1 Ambassador phone system (must elliminate 80m breakthrul). C4L01, 22 Island Wall, Whitstable, Kent CT5 1EP. tel: 0227 266480, anytime.

WIRELESS SENDER No76 with supply unit rectifier No14 and psu No18; also R109 A/8. Any eables lor WS(CDN) No29, partirularly connector lrom psu to '8' set or WHY? Taylor, G3UCT, 1 Morewarren Close, Wilton, Sallsbury, Wilts SP2 0LY. tel: Sallsbury 744133.

BELCOM LS201L. Good money given lor tcvr in perfect condx. McIntyre,, tel: Belfast 795783.

YAESU FRC9600 scanner must be gc. Also Sony Alr 7 rx. Mackay, tel: Inverness 220049.

2 OR 3-ELE TRIBAND BEAM. G3MVK, O1HR, tel: Newport Shropshire 811529.

ORAKE C-line separates, Tx4C, R4C and ancillaries, must be mint. If lound would have Drake TR4CW lor sale. GW4RYK, tel: Abermule 255.

LOAN/PURCHASE OST Jan 1978 or photocopy K28LA article on bulfored morse keyboard. Also lnlo on source for MC14501 B-l/p Nand/and gate and 88C30 dual dillerential line driver ICs. G4ETJ, OTHR, tal: 025 86239.

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PROMPT CASH IS WAITING FOR any solid-state rx lrom Racal, Eddystone, R&S etr lor private rollection. Also Spectrum analyzer lrom hp or plug-in type for Tek 500/560/7000 series and Tek 1S1 ard 152 and any plug-in lor 7000 series. Will inspect and collect in Feb/Marrh 1987. Please send a short description to Kay Srhnelderelt, Frankenweg 24, 4630 Bochum 6, W Germany OR tel: 010 49 2327 57853 between 1pm-3pm Saturdays only.

4m MICROWAVE MODULE TVTR (or similar) 28MHz IF required by Horsham Amateur Radio Club. Bryn, G3SWC, tel: 040 372 2444, evenings.

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MARCONI TF1076 series portable freq meters or absorption wavemeters). Models required are TF1026 1F1026/2 and TF1026/3. Also required, lor spare parts, dead IC2025 and leak 2000 tuner amplifier. BUY OR BORROW: Handbooks lor Apple2 plus plug-ins as lollows, Apple parallel, Apple centronics, Apple Super serial, Arlstocard rentronlrs, Videx 80-column, double vision, super terminal, Tangrage card and ZBO card. Peter, G8ZKZ, O1HR or tel: Romlord 69770.

FOR AVO ELECTRONIC TEST METER type 2628U5S0 bench model: moter, just pointer will do. Help please! Also: 5P31C, 5P102, FA514R lant swl AX25 THC, SM10 All enquiries answered. Jim, G4WSH, O1HR, tel: 0326 290 483.

AR88LF 1944 rirrrlt/wire diagram, on behall ol F5NJ. Roy, G4KME, OTHR, tel: 07B2 50344.

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FT221R MATCHING SPKR. HP8481A head lor HP435A. G6KOA, O1HR, (Birmingham), tel: 021 458 1941.

HUTEK TVTR MODEL TVVF144A 10m-2m, mrst be mint condx. Best price paid. Paul, G10YK, Irowbridgc, Wilts. tel: Irowbridge 3827, evenings only.

FT225RD or Trio TS770E. Will pay gd price depending on condx and any mods. Paul, G4OXB, O1HR tel: 02774 53561, evenings.

YAESU FL2100B hf linear, vgc with instr booklet. G4MKO, O1HR, tel: 0905 26410.

YAESU hf tx. FT901DM or FT101ZD, 6 or 9-band version. Also FV101DM, must be ex condx, unmodllled and with handbook. Gd price pd lor right one. Will collect. G3HRH, O1HR, tel: 0962 712045 home or 0962 822243, office.

MANUAL FOR SOLARIRON CD1014.3 scope. Photocopy OK or will return your manual promptly alter copying. Please help as mfr says this manual now ort of print. Dave, G3LSL, NOT O1HR, tel: 0264 710514.

MRO Junior, MRO-M, MRO-MX, MRO-5, MRO-W, MRO-S1, MRO-5RA, MRO-71, MRO-50, MRO-60, NC1, NC300, NC303 MRO spkrs, coll holders, psus, table/rack versions Plus other national company Malden rxs, catalogre manrals, equip txs, German/Japanese MRO copies. Varkells, tal: St Albans 39339.

TR9500. Chris, G3TUX, O1HR, tel: 0428 56255 office

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INFORMATION/USERS HANDBOOK/W/S man lor Raral RA17L Rig talks to me brt can't convince it to do what I want! G4VCC, OTHR, tel: 0981 540518, alter 6pm.

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ORAKE MN2700 atu, lrlo SP180 spkr, Hansen FS7 meter, mobile brkt lrlo TR9000 rangr, fm board Yaesu FT101 range, gd grality coax and conns, Sennhelser "open type" headphones, Yaesr MH1 desk/mic. Alan, G62YC, tel: Rrshden 318493.

FT221R, FT22SRD or similar, preferably in gd condx Gd price lor gd rig. Still looking lor Bird thrulline, also transistorized hl tcvr. Any condx, wkg or not. Someone must have one! Give rs a ring. C3X0A, O1HR, tel: 0775 66533.

NATIONAL 200 hl tx/rx. Any condx. Also handbook Heathkit villu vlo. G4HWL, O1HR.

10 COMPLETE WW2 Humbar wireless Bcwt trrrk 1941 wireless set No.11, No.21 or No.9 British. Very interested in photos or lnlo from any Royal Signals personnel who used Number FFW trucks and sets during 1941-1946. G42WD, tel: 0273 508573.

ORAKE R-7 or R-7A, top condx. MF triband beam, WHY? G4DED, OTHR, tel: 08675 2215.

ORAKE R4C rx. Bailey, GM8BBA, O1MR, tel: 069B 2B3692, weekdays only.

EX WD 3.5 or 3A rl thermo rouple metor, sqrare front llange 2.25"x2.25". CW31FV, OTHR, tel: Cardigan 614487

KW VICEROY, EA12, IS700, ET221R, LG300, 5kV smoothing caps, any rondx ronsiderad. Smlllle, tel: 0555 892540.

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A COPY OF the elrcrit diagram or service manual lor the Farnell switch mode psu, model no F234S. If you can help pleasr rontact Eddie Oliver, G62SI tel: 0865 711167, evenings.

EDDYSTONE 730/4 and 770R/1 manuals and service lnlo. Also AVO valve rharacteristic meter MK2 instr book. BRS 85B78 11 Outwoods Strcet, Orrton on Trent, Staffs. tel: 0283 39009.

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FI200 TCVR C/W PSU AND CW FILTER and handbook. Must be in gd condx wkg and rnmodlllrd. Also reqrlrr clrcult diag and alignment details for Eddystone 84A. G4USI, tel: Leebotwood 441.

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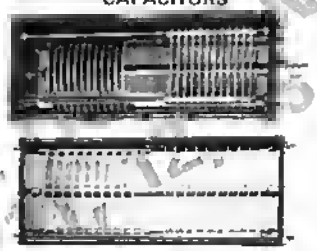

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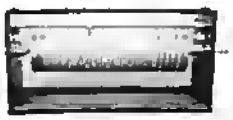

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THE ANNUAL MEETING OF THE SOCIETY

Minutes of the sixtieth Annual Meeting of the Radio Society of Great Britain, held at the Institution of Electrical Engineers, Savoy Place, London WC2 0BL, on Saturday 6 December 1986 at 2pm.

Present: Mr W J McClintock, G3VPK (President, in the Chair); Mr P F D Cornish, G3COR, Honorary Treasurer; Mrs J Heathershaw, G4CHH, Immediate Past-President; Mr F D Hall, GM8BZX, Executive Vice-President; Mr D A Evans, G3OUF, Secretary and Chief Executive; and 172 corporate members.

The President welcomed members to the meeting and outlined its format. Firstly there would be the Annual General Meeting, which was required by law. There would then be an Extraordinary General Meeting, during which four resolutions put forward by Council would be discussed. Following a break for tea there would be an "Open Meeting", which would give members a chance to raise matters which they felt would be of interest to everyone.

The President then announced the formal opening of the Annual General Meeting.

Annual General Meeting

The President introduced those present on the rostrum and read out the apologies for absence. He said that since me[illegible] 50 members were present, a quorum existed. The Preside[illegible]h[illegible]hat the notice calling the meeting had been circulated with the [illegible]ber 1986 edition of Radio Communication. The Secretary read the first part of the calling notice and proposed that, to save time, agenda items be read as they arose.

Minutes of the 59th Annual General Meeting

The President stated that the Minutes of the 59th Annual General Meeting had been circulated with the May 1986 edition of Radio Communication. He said that it was Council's wish that members should have an opportunity to comment on the Minutes, although he added that since the Minutes had been published there had been no written comments concerning them. He invited comments from the floor.

Mr I Abel, G3ZHI, said that although he was a non-member he was speaking by right of proxy on behalf of a corporate member, Mr F Pickersgill, G3XXN. He said that he (Mr Abel) had requested a breakdown of committee expenses in the previous year, which had only been partially given; he wished to know whether a further breakdown would be given this year. Mr Abel also wished to draw attention to a letter which he said he had received from the Society's auditors, Messrs Moores & Rowland; according to Mr Abel, Messrs Moores & Rowland had agreed with Mr Abel that they were not happy with the state of affairs of the accounts of the Society. The President said that the current agenda item was concerned with the accuracy of the Minutes of the last Annual General Meeting and he asked Mr Abel which part of them required amendment. Mr Abel replied that he was concerned with the breakdown of the accounts. The President said that this matter would be dealt with by the Honorary Treasurer when answering questions on the accounts. He then invited further comments on the Minutes of the last meeting.

Mr K Partridge, G8AUU, said that at last years' meeting he had requested that the Chairman announce early on in the course of the meeting the number of votes he or she was holding as proxy. He said that this had not been minuted and wondered whether such an announcement would be made this year. The President stated that the Secretary would amend the Minutes and that he would shortly announce the number of proxy votes which were held.

Mr I Abel, G3ZHI, again speaking on behalf of Mr F Pickersgill, G3XXN, said that a figure quoted by Dr D Evans, G3RPE, in the context of comments concerning the proposed novice licence had been incorrect. The President asked whether Mr Abel had said as much at last years' meeting. Mr Abel replied that he had not had the figures at the time. The President explained that if Mr Abel had not said it at the meeting it could not form part of the Minutes of the meeting, since they were a record of what took place at the time.

An unidentified member said that he had noted that the Minutes had been published some two or three months after the meeting had taken place. He hoped that this practice would continue, since it was pleasing to see them in such a timely manner. The President said that this was now the intended practice for the future.

There were no more comments on the Minutes of the 59th Annual General Meeting.

Accounts for the year ended 30 June 1986, and the reports of Council and auditors

The President invited the Honorary Treasurer to read out the formal report of the auditors. In their opinion the accounts, prepared under the historical costs convention, gave a true and fair view of the Society and its subsidiaries as at 30 June 1986 and complied with the terms of the Companies Act 1985. This statement was signed by Moores & Rowland.

The President then invited questions with regard to the accounts:

Mr A Veitch, G[illegible] noted that a profit of £4 000 had been made in the [illegible]lated the Honorary Treasurer. He asked whether [illegible] surplus of £4 000 would be sufficient for [illegible]d to be rather a small sum, and he [illegible] about it. The Honorary Treasurer replied [illegible]ge amount but that, as far as the current year was concerned, successive deficits of small sums had been converted to a small surplus. He added that if the Society had not been quite so prudent in certain areas it might have shown a smaller surplus, but the opportunity had been taken to make provisions for various items that had been considered to be appropriate. The Honorary Treasurer agreed with Mr Veitch that the surplus was not great and said that one important factor was the sales of publications. Mr Veitch asked whether there was a possibility of an increase in the subscription rates. The President replied that this was always a possibility; however, he felt that many members would prefer that the rates were not increased. He added that there was a delicate balance in this area insofar as the Society did not wish either to make a large profit or a large loss and was essentially attempting to break even whilst carrying out its necessary work for the well-being of amateur radio.

Mr C Smith, G4AJJ, said that he was also pleased to note a small surplus in the current year and wished to congratulate Council on this achievement. He had noted that the accountant's report had mentioned a projected satisfactory outcome for the current year and asked the Honorary Treasurer for the budgeted surplus figure. The Honorary

Treasurer replied that at present this was a matter of conjecture and that at present he had two projected budgets in his possession. He said that one showed a small surplus and one showed a small loss.

Mr J Bluff, G3SJE, asked whether the Society had enough resources to meet the costs of litigation or a sustained campaign to defend the well-being of amateur radio. The Honorary Treasurer said that the question was difficult since the costs of such matters were difficult to quantify. His professional activities made him very aware of how expensive litigation could be. He added that if the Society was forced to spend, for example, £10,000 on the defence of a particular aspect of amateur radio, that would be the amount of the difference made to the current years' budget. However, the Society had no such litigation in prospect at present. Mr Bluff said that it seemed to him that the assets of the Society were very small in relation to its membership and that most of the Society's assets were in property owned by itself. He did not feel that resources of any sort were available for litigation or allied matters, and added that difficult circumstances tended to manifest themselves when least expected or desired. The Honorary Treasurer said that he saw Mr Bluff's point and that his figure of £10,000 had been quoted in terms of the defence of a relatively small legal action where possibly the Society lost the case and was also forced to pay the costs of the other party. He added that it was quite true that, if the Society was forced into a very deep and extended course of action involving high professional charges, there would be a problem. However, he did not feel that such difficulties were very likely at present.

The Secretary said that the Society had had occasion to consider this problem earlier in the year. Essentially, the Society invested a good deal of its available money in various facilities and services to members. If financial resources were urgently needed it might be possible to appeal to members to support a particular cause. The Secretary felt that some money could be raised in this way if it became necessary.

Mr J Blackwood, G3TG, asked what effect currency fluctuations would have on the Society's subscription to IARU Region 1, especially with respect to the movement of the Swiss franc against the pound. The Honorary Treasurer said that adverse currency movements were obviously a problem. He added that Mr Blackwood's question was evidently linked to the increase in the IARU subscription for the current year; this had been the subject of a particular point which the Honorary Treasurer had made to Council. The increased charge was £13 156, which was substantially higher than both the budgeted figure and the charge for the previous year of £10 137. There were two reasons for this. One was that the per capita fee for licensed members of the Society had been increased from 1.15 SwFr to 1.50 SwFr. The other was that the pound sterling had fallen in value against the Swiss franc. However, the major part of the increase had been a consequence of the increased per capita fee.

The President said that the Society was fortunate to have the current Secretary of IARU Region 1, Dr J Allaway, G3FKM, as a member of Council and invited him to comment on the matter. Dr Allaway said that the situation was not quite as bad as it appeared since there was a possibility of the per capita fee of 1.50 SwFr being reduced to the former figure of 1.15 SwFr next year.

Mr I Abel, G3ZNI, again speaking on behalf of Mr F Pickeragill, G3XXN, noted that a full breakdown of committees expenses had not been given in the accounts for the current year. He asked whether a full breakdown of individual expenses in the accounts would be made available, as he had requested in the previous year. The President said that the precise figures relating to individual committees were recorded by Headquarters staff and that information relating to committee expenses was available to every corporate member if they wished to consult the documents at Headquarters. Mr Abel said that this had not been made clear at the last meeting and that, if it had been, a good deal of confusion would not have taken place. He was very pleased to hear the President's remarks and would make every effort to get to Potters Bar to investigate the figures and publicise them. The President stressed that the figures which Mr Abel would receive would be those relating to individual committees; no further breakdown would be available.

Mr M Bolt, G4SUI, asked whether Council could explain why there had only been a slight increase in subscription income in the current financial year. He wondered whether this was because fewer new members were joining the Society or that more members were resigning. The Honorary Treasurer said that the net increase in membership in the course of the year had not been very great.

An unidentified member felt that the Society should pay more attention to revenue from the sales of its publications. The President said that the Society needed more books to sell and also required assistance with the production of books. He added that many changes were in hand and that later in the meeting this topic could be examined in more depth.

Mr G Robotham, G8KLH, requested the President to ask the meeting whether it was satisfied with the level of reserve funds available to the Society in view of the obligations likely to be incurred during the next two years. The President invited the Honorary Treasurer to comment. In his reply the Honorary Treasurer emphasised that the Society's finances were not operated on the basis of reserving during the present for expenditure in the future; the intention was that the Society should live on its income year by year. No large financial demands upon the Society other than those incurred in the normal course of its business were foreseen for the future, and on that basis the Society had adequate funds. However, if it seemed that the Society would have to spend large sums of money in the course of - for example - the next two years, two questions would arise. One would be to what extent that expenditure had been taken into account in the course of normal budgeting or forecasting, and the other related to how such expenditure was to be financed. The Society's management felt that adequate funding was available for all its ordinary business and that no undue outlay was currently envisaged.

Mr J Whetstone, G4OUB, stated that he was in favour of the concept of appealing to the membership in the event of funds being required for legislation and that he would certainly give money to support such an appeal. The President thanked Mr Whetstone for his comment and said that it seemed that most members would support the Society in such circumstances.

Mr M Bolt, G4SUI, said that if the amount of interest in the Society's affairs was typified by the small number of members attending the annual meeting, there seemed to him to be little chance of raising very much money.

Mr P Hawker, G3VA, said that he had noted that the number of new members had, for the first time, not been given in the annual report; there had been no breakdown of the figures and the entire topic of membership had occupied only eight lines. He wondered whether the previous situation could be restored and why so little information had been given. The Secretary said that there had been no deliberate intention to leave out any information; the annual report changed its perspective from year to year and various different aspects of the Society's work were stressed each year. He added that if members felt the topic to be important, there was no reason why it should not feature in future reports; however, he stated that in his extensive correspondence he had received no other comments relating to this point.

Mr D Moffatt, G3RAU, wished to return to the topic of possible legal action. He felt that everyone was aware of the reasons for the membership's concern, which had not so far been mentioned in the meeting; it seemed to him that the Society seemed to be threatened with the most serious problems it had faced throughout its history. He said that the people with which the Society could conceivably be involved in litigation were well aware of the level of the Society's reserves and could form a judgment of the likelihood of the Society entering into extensive legal action. Mr Moffatt wished to ask the Honorary Treasurer whether there would be technical difficulties in the Society making an appeal on virtually an emergency basis for liquid funds with which to enter into litigation should the need arise: he felt that the mechanism should be set up in advance so that it could be quickly invoked if necessary.

An unidentified member asked whether the Society had considered legal expenses insurance. The President thought that it had and asked the Secretary to comment. The Secretary said that the Society had recently received a quotation for legal costs insurance, although the premium involved was quite high; an approximate figure would be £1 per member per year. This information had only been received very recently and there had been no proper opportunity to discuss it within the Society. However, Council had to judge whether members were prepared to accept the necessity for an additional fee for something as intangible as legal costs insurance. The Secretary added that the topic would be addressed next year.

Mr S Linfoot, G0CPP, asked whether the Society had knowledge of what funds were available to the litigants referred to in previous questions and whether or not they were members of the Society. The President said that he was not quite sure which potential litigants were being referred to. He invited the Secretary to answer Mr Linfoot's question. The Secretary said that he imagined that questioners were referring to problems which had been experienced earlier in the year with regard to electromagnetic compatibility. This had been the subject of intensive discussions within the Society, and the problems of funding any related litigation had also been considered. He stressed that the Society was determined to do what was right for British radio amateurs if the need arose, although it had not yet done so. If there was a need for fund-raising, there appeared to be no difficulties in doing so by means of an appeal to the membership. The Secretary added that the Society existed to carry out the wishes of its members. If litigation was not supported by the membership, it would clearly be impossible to enter into it.

Mr R Broadbent, G3AAJ, asked whether authors could not be obtained to amend some of the Society's publications. He also felt that individuals would be more prepared to write for the Society if author's fees, or possibly the percentage of the royalties, were published. Mr Broadbent also asked what perrentage had been received by authors for publications appearing in 1985-86. In his reply the Honorary Treasurer regretted that he did not have that information to hand; it could have been provided if Mr Broadbent had sent in his question in writing prior to the meeting.

Mr K Killgrew, G6DZH, asked the Honorary Treasurer to explain the large increase in the amount spent on foreign travel in the 1985-86 financial year and to give a resume of what travel had taken place. The Honorary Treasurer said that the principal items of expense incurred had been related to the Region 3 IARU Conference in New Zealand, which had been attended by the Chairman of the IARU Committee and the Secretary. Mr Fisher, G3WSN, the Society's VHF Manager, also referred to the Region 1 IARU Working Group meeting in Vienna. The speaker asked whether the expenses included those associated with the Friedrichshafen and Hanover events taking place in the current year. The President said that they did not; those events were generally attended by the President or his/her representative and the associated expenses would be a charge on the Presidential budget. In the 1985-86 financial year this had been set at £5 500, although only £3 647 had been spent.

Dr D Evans, G3RPE, said that in his opinion the membership was worried

about the Society's financial vulnerability. It seemed to him that for many years the Society's subscription rates had been far too low. Increases only took place when the Society was forced to make them, and the resulting service to members was only just adequate. He felt that a significant - although not necessarily large - increase in subscription could lead to a very great increase in the number of services provided for members. Dr Evans added that in the course of visits to amateur radio clubs, he had heard remarks to the effect that the Society should indeed increase its subscription if this would result in the achievement of the desired results.

Mr N Stokes, G3ZXZ, said that he held an opposite view to that of Dr Evans. He felt that an increase in subscriptions would lead to many members failing to renew their subscriptions; the increase in membership during 1985-86 had been very small indeed.

Dr Evans said that his argument was that a quite disproportionate increase in the services available to members could become available for a relatively small increase in the subscription rate.

An unidentified member asked whether Council would consider producing information on what extra services could become available for an increase in subscriptions. This could then be put to the membership, which could elect either to choose to have the new services on the basis of an increased subscription or not. He did not consider it very useful to discuss the matter in an abstract way.

Another unidentified member noted that there had been a substantial decrease in expenditure on amateur radio-related awards. He felt that either everyone had satisfied the requirements for awards or that no-one was interested in applying for them. The Honorary Treasurer said that part of the expenditure relating to awards was associated with the printing of certificates and that this was not carried out every year.

Mr P Crosland, G6JNS, asked whether the Honorary Treasurer could give any indication of the losses which had occurred as a result of delays in publishing some of the Society's books because of certain members of the Technical and Publications Committee not having dealt with matters in a timely manner. The Honorary Treasurer replied that he could not; it was not possible to say that a given amount had been lost as a result of delays in publication. Such delays implied that the income would accrue later rather than sooner.

The President then declared this part of the meeting at an end. However, before continuing he said that earlier in the meeting there had been a request that he should declare the number of proxy votes which he held. He therefore felt it appropriate at this stage to read out all the proxy votes and asked the Secretary to do so. The Secretary read out the names of the holders of proxy votes and the number of proxy votes held by them.

Mr K Marriott, G8TWH, said that his name did not appear on the list of proxy holders and that he would be taking the matter up with the postal authorities. The Secretary commented that there were a number of invalid proxy votes for various reasons.

Mr I Abel, G3ZHI, made an inaudible remark, at which point an unidentified member requested a ruling. It seemed to the latter that anyone present at the meeting who was not a member could address the meeting on a subject upon which he had been briefed. The President stated that Mr Abel could only take part in the meeting on behalf of his proxy; he could not, as a non-member, participate on his own behalf.

The previous speaker asked how many proxy votes had been invalidated. The Secretary replied that a total of 34 proxy votes were not valid.

Mr P Crosland, G6JNS, said that the normal practice in respect of a limited company was for the proxy form to show all the motions and to allow the person giving the proxy the opportunity to say whether he or she wished the proxy holder to vote in favour of or against each individual motion. He asked why the Society did not follow this practice. The Secretary noted that, historically, the form of the proxy had always been the same and the format of the proxy was laid out in Article 48 of the Society's Memorandum and Articles of Association.

Mr M Butler, G4UXC, said that it was his understanding that Mr G Jessop, G6JP, also had some feelings about this matter and that it seemed to him that the Society was not complying with company law. The President said that the matter would be looked into, since the Society had a clear duty to comply with the relevant legislation.

Members to serve on Council for 1987

The President read the letter from the scrutineers announcing the results of the recent Council election; these were as follows;

> Mr R G Barrett, GW8HEZ, 2,080 votes; Mr N C Brinkworth, G3UFB, 2,264 votes; Mr P L Crosland, G6JNS, 1,710 votes; Mr G R Jessop, G6JP, 2,941 votes; Mr M J Matthews, G3JFF, 1,774 votes; Mr B O'Brien, G2AMV, 2,688 votes; Mr L W Ross, G8MWR, 1,904 votes. He therefore announced that the names of those occupying the first three places were Messrs Jessop, O'Brien and Brinkworth.

The President said that it was the Society's practice to confirm the appointments of directors who were more than 70 years of age and that Mr G Jessop, G6JP, who had been elected, came into this category since his 70th birthday had been on 25 August 1977. Mr M Matthews, G3JFF, proposed and Mr T Lundegard, G3GJW, seconded the motion that Mr Jessop's election to Council be confirmed by the meeting. The President requested a show of hands and declared that there was an overwhelming majority in favour of the motion. An unidentified speaker called for a poll vote. The President invited the speaker to explain why he was calling for a poll vote on the motion, which the speaker declined to do. The President, satisfied that the member had the support of four other corporate members, called upon the Secretary to begin the procedure. The Secretary said that the poll vote did not necessarily have to be taken at the present time; the Chairman of the meeting could either conduct the vote now or alternatively conduct it on the basis of the figures which had already been established earlier in the meeting. All proxy vote holders and the number of proxies held were already available, and the Secretary therefore proposed to read out the names of proxy holders and invite them to state how they wished to use their votes.

The President announced the motion, which was "That Mr G Jessop be confirmed as a member of Council for the following year".

The Secretary called out the names of proxy vote holders and requested that they cast their votes. This was carried out.

The President declared that although he had not counted the votes there was overwhelming support for the motion; however, he would ensure that the votes were counted and the result would be given later. (The final result was: for - 1370; against - 20; with 28 abstentions). He therefore wished to announce that the members of the 1987 Council would be as follows; President, Mrs J Hawthershaw, G4CHH; Immediate Past-President, Mr W McClintock, G3VPK; Honorary Treasurer, Mr P F D Cornish, G3COR. Ordinary members; Dr E J Allaway, G3FKM; Mr J T Barnes, GI3USS; Mr N G Brinkworth, G3UFB; Mr E J Case, GW4HWR; Dr J N Gannaway, G3YCF; Mr J Greenwell, G3AEZ; Mr F Hall, GM8BZX; Mr D Heys, G3BDQ; Mr C R Jessop, G6JP; Mr A McKenzie, G3OSS; Mr B O'Brien, G2AMV; Mr N F O'Brien, G3LP; Mr H S Pinchin, G3VPE; Mr F S G Rose, G2DRT; and Mr D S Smith, G4DAX.

The President then thanked the scrutineers who had performed the count and called for volunteer scrutineers for the 1988 Council election. Messrs. Hewes, G3TDR; Stancey, G3MCK; Winchcombe, G6ZH; Bonty, G3KKQ; Newnham, G6NZ; Hickmott, G8MFB; Ward, G2CVV; Crosland, G6JNS; Brothwell, G4EAN; Bower, G3COJ; Sharp, G4VNR; Butcher, G3FSN; Hughes, G4WKJ; Bolt, G4SHI; Hills, G0BDA; and Dunell, G3BYW volunteered their names.

Appointment of auditors and fixing of their remuneration

The President announced the resolution that Messrs Moores & Rowland be appointed as auditors of the Society for the ensuing year and that their remuneration be fixed by Council and called for a proposer and seconder. Mr Crosland proposed and Mr C Newton, G2FKZ, seconded the resolution. On a show of hands the President declared the resolution carried. The President then declared the Annual General Meeting at an end.

Presentation of the Marconi Medal

Prior to the commencement of the Extraordinary General Meeting proper, the President explained that he would like to bring one item forward since those involved needed to leave the meeting shortly. He felt that members would not object to the early presentation of the Marconi Medal. On behalf of the meeting he welcomed Mr Robin Robertson, Managing Director of Marconi Communications Ltd. He then called upon Mr Robertson to present the Marconi Medal and Premium to Mr Simon Freeman, G3LQR.

Mr Robertson said that it gave him great pleasure to present the award and that he was pleased to see the electronics industry and amateur radio linked in this way. He then asked Mr Simon Freeman, G3LQR, to come forward to receive the award. The meeting applauded as Mr Freeman thanked Mr Robertson.

Extraordinary General Meeting

The President then opened the Extraordinary General Meeting and asked the Secretary to read the notice convening the meeting. The President then invited the meeting to consider Resolution 1, which was:

"That the Articles of Association of the Company be altered by deleting from paragraph 10 the words:

> 'and shall serve for a period of one year from the first day of January immediately following his/her appointment but shall not be eligible to serve as President for two consecutive years. He/she shall however continue to serve as a Member of the Council in the office of Immediate Past-President for the year following his/her year of office as President'

and substituting for those words:

> 'and shall serve for a period of one year from the first day of January immediately following his/her appointment. The Council may re-appoint him/her as President for a further year in office but no

President shall be eligible to serve for three consecutive years. He/she shall however continue to serve as a Member of the Council in the office of Immediate Past-President until the end of the appointment term of office as President-Elect of his or her successor as President'"

The President added Council's view, which was that "The Council considers that where a President has served well in that Office, and is willing to serve a second term it should have the power to re-appoint him or her. It is always difficult to strike the right balance in a democratically controlled organisation, but the Council's view is that in appropriate cases the experience gained as President can be used for the benefit of Members during a second year, and that more continuity will be for the benefit of the Society as a whole."

The President invited Mr B O'Brien, G2AMV, to introduce the resolution. Mr O'Brien noted that, as far as he was aware, the RSGB was the only national society which limited the office of President to one year only, and noted examples from several countries. He noted the formidable work-load of a President and said that Council should have the choice of re-appointing a President for one additional year, if necessary.

Mr M Butler, G4UXG, considered that the meeting was completely wasting its time, since it was obvious that the large number of proxy votes held by those on the rostrum would force the carriage of any resolution if it was desired. He moved that a vote on the resolution be taken immediately and that the meeting move on to its next part.

Mr J Blackwood, G3TG, felt that the resolution was unsatisfactory since it would mean that the person invited to serve a second term would not have to submit himself or herself for re-election to Council by the membership as a whole. The need for the membership to take part in deciding who would or would not be members of Council would be removed under the terms of the proposed resolution. He said that it could imply that a particular person could serve six years, or possibly more, on Council without submitting to re-election, and this was unfair to the membership.

An unidentified speaker commented that a President could be appointed during his or her second year of office as a member of Council. This could imply one year as a normal Council member, two years as President, a further year as a member of Council, a further term of two years as President and a final year as a normal member of Council. It was not impossible that this situation could occur, and would imply seven years.

Mr L Mansfield, G2SP, said that, as had already been stated by Mr M Butler, G4UXG, there was no point in debating the resolution any further. He seconded Mr Butler's proposal that a vote be taken. The President called for a show of hands on a motion that the vote on Resolution No.1 of the EGM be taken without further discussion. On a show of hands, the motion was carried. The President then asked for a vote on Resolution No.1, pointing out that a two- thirds majority was required. On a show of hands the resolution was carried, with 131 votes in favour, 17 votes against, and 14 abstentions. In response to a question from the floor, the President explained that proxy votes were not taken into account.

The President then invited the meeting to consider Resolution No.2, which was:

"That the Articles of Association of the Company be altered by deleting from paragraph 26 the words:

'until he shall have been a corporate member for not less than three years immediately prior to the date of his nomination'

and substituting for those words:

'until he shall have been a corporate member for not less than five years immediately prior to the date of his nomination'"

The President then read the note accompanying this resolution.

The President invited Mr A McKenzie, G3OSS, to introduce the resolution. He then asked whether there were any views from the floor in respect of the proposed resolution.

Mr M Butler, G4UXG, stated that in his view the large number of proxy votes held by members on the rostrum negated the point of debate. He moved that the vote be taken. The President explained that it was not their wish to take a proxy poll in view of the time which would be taken up in so doing. He again asked for views from the floor.

Mr M Bolt, G4SUI, felt that a member should be entitled to representation, and the recording of such representation, immediately upon joining the Society, since otherwise the member would have to wait much longer for his views to become known. He added that amateur radio magazines had carried comments to the effect that criticism of the Society should take place from within: if a time was laid down before which a member could be said to be "within", people would be discouraged from joining the Society.

Mr G Taylor, G3MDG, said that his only objection to the proposed resolution was that it effectively debarred younger members from becoming members of Council, and therefore deprived them of a say in the activities of Council.

Mr A McKenzie, G3OSS, said that there was plenty of representation of individual members via clubs, Council and Headquarters. He wished to reiterate that being a member of Council entailed being a director of the Radio Society of Great Britain, and he could not see how an individual who had only been a member of the Society for a short time could represent a large number of members in a valid way.

Mr C Reid, G8MFP, felt that five years was too long and that three years was sufficient. He said that if an individual had enough intelligence to pass the Radio Amateur's Examination and to become a radio amateur, he or she would be intelligent enough to learn how the Society functioned within three years.

Mr G Rutt, G0AMG, expressed concern about the conduct of the debate. He said that the Chair had expressed a view from his privileged position in favour of the motion and that the Council member who had spoken in favour of the motion - Mr A McKenzie, G3OSS - had done so twice. Mr Rutt was also concerned that there seemed no guarantee that, if the resolution was adopted, an individual could not remain totally inactive in the Society apart from occasionally filling in a proxy form and could then either seek election or nomination another for election. He was against the motion.

Mr M Stokes, G3ZXZ, said that representation as referred to by Mr McKenzie appeared in certain areas to be defective. The proceedings of the Council meeting of 28 October 1985 had not appeared in Radio Communication until the edition dated July 1986. Equally, a Regional Representatives' Conference was supposed to take place every three years, although in his area there was only six months to go before that period expired. He asked how the membership was supposed to keep in touch when there appeared to be a lack of communication at grass-roots level.

Mr E Cadmark, G5CO, stated that he opposed the resolution. He said that if an individual had passed the Radio Amateur's Examination and possibly the Morse test, obtained his or her amateur radio licence and joined the Society, that person should be entitled to all the privileges of membership.

Mr S Bryen, G1SGB, felt that as a new licensee who was paying his annual subscription to the Society, he was entitled to as much - if not more - assistance from the Society as an individual who had been a member for a longer period and had more experience.

Mr J Allen, G3DOT, said that he was rather puzzled as to the precise topic under debate. He felt that objectors to the motion were suggesting that the time for which a corporate member had to be a member of the Society before being allowed to stand for Council was to be increased from three to five years. The President assured Mr Allen that that was the object of the resolution. Mr Allen said that in his opinion most contributions to the debate were not addressing this point at all. He felt that the skills involved in being a Council Member could not be picked up overnight, and indeed that in his view the period of time involved should be seven years.

Mr D Johnson, G1GNS, said that he had come to the meeting as a fairly new member of the Society, with the intention of observing and learning. He had been a member for three and a half years and considered that that was neither long enough time to learn how to operate as a member of Council nor to act as the director of a company. He could not see why new members of the Society should want to make immediate nominations for membership of Council.

Mr T Campbell-Davies, G3YMM, suggested that the meeting should consider the motion carefully. He said that, as it happened, he was a director of a number of companies and that he fully took Mr McKenzie's point about the experience required. However, in his view that was not entirely the purpose behind either the present resolution or the one which was to be debated next.

Mr Campbell-Davies said that he considered Council's primary duty to be the running of the Society in the interests of its members. He added that its second duty, which was almost as important, was to keep the Society's membership involved in and informed about its activities. Mr Campbell-Davies said that the cost of eliminating certain elements of the membership had been evident during the meeting, with rude and unhelpful interjections and a request for a poll vote when it clearly was not necessary. That was the price paid for doing things badly. He considered that ways must be found of making communication with the membership much more successful and - for example - avoiding events such as the one cited earlier in the meeting in which a report of Council proceedings was not published until nine months after they had taken place. Mr Campbell-Davies said that the reason he would like the meeting to consider the present and following resolutions carefully was that he considered them essentially defensive actions originated by a Council which considered itself beleaguered by the type of objections which had been experienced from part of the membership present at the meeting. He did not feel that such objections were the outcome of anything other than the Society's inability to communicate adequately, and he did not consider that the Society was in danger from factions. However, the Society was obliged to deal with any faction in a democratic and sensible way insofar as it represented a proportion of the Society's membership.

Mr Campbell-Davies suggested to the meeting that the danger of allowing the present resolution and the next one to be debated to be carried would be the resulting potential for the alienation of many new and younger members of the Society, and that there would be no particularly valuable purpose in carrying the resolutions. For those reasons, he considered that the meeting should vote against them both. He added that, despite the fact that the resolutions had been put by Council, Mrs Heathershaw and Mr McClintock were in a position to overturn them as a result of the large number of proxy votes which they both held. If they did not, Mr Campbell-Davies considered that this would be a signal to the effect that Council did not listen to the views of the membership at

large. He asked the meeting to vote against both motions.

Mr M Toms, RS 31976, said that he took great exception to Mr Godsmark's assertion that passing the Radio Amateur's Examination was a qualification to become a radio amateur. He added that he opposed the motion and entirely agreed with the remarks made by the previous speaker. If an individual did not possess the necessary organisational and business qualifications to serve as a member of the Society's Council, the length of time for which they had been a Society member was irrelevant.

Mr R Pearce, G3ZTC, commented that anyone who was clearly unsuitable to serve on Council would presumably not be voted for by the membership at large.

Mr J Sutton, G3TVY, said that an amateur radio licence could be held from the age of 14 onwards. Five years later an individual licence holder could still only be 19 years of age but could be elected to the Society's Council. Mr Sutton said that a similar anomalous situation could exist in reverse in the case of, for example, a 60-year old manager of an international company who then retired; he could be interested in amateur radio and have the time and experience to serve as an able Council member, but he would be effectively debarred from doing so for five years. It seemed to him that no time limit at all was necessary.

Mr R Glaisher, G6LX, considered that both the resolution currently being debated and the following resolution should be voted against, since the situation was self-regulating; the membership would decide who would serve on Council and would not vote for candidates who were not suitable.

Mr J Wright, RS 18582, drew the attention of the meeting to the earlier system of Town Representatives, who could be consulted on matters such as a candidate's suitability to serve on Council.

The President reminded the meeting that a two-thirds majority was required for the resolution to be carried and asked for a proposer and seconder. Mr A McKenzie, G3OSS, proposed and Maj K Ellis, G5KW, seconded the motion. On a show of hands, the requisite two-thirds majority was not reached. The President declared that Resolution No.2 was therefore defeated. (No poll was demanded).

The President then invited the meeting to consider Resolution No.3, the text of which was as follows:

'That the Articles of Association of the Company be altered by adding to paragraph 52 after the words 'any 10 corporate members' the following words:

'who have been corporate members for not less than five years'"

Mr K Fisher, G3WSN, felt that much of the debate with reference to Resolution No.2 also concerned the present resolution. He felt that every member should bear in mind his or her obligation to be satisfied that anyone they wished to nominate to serve on the Society's Council was eminently suitable to do so.

An unidentified speaker proposed that the question be put. The President called for a proposer and seconder. Mr F Hall, GM6BZK, proposed and Mr K Killgrew, G6DZH, seconded the motion.

A show of hands then took place but whilst the votes cast were being added-up, Mr A McKenzie, G3OSS, called for a poll vote, which was supported by four other corporate members. Mr McKenzie explained that he had a good reason for this request. Less than 10% of the membership voted for Council members each year and, so had been evident from the trade union movement in the past year, it was possible for a single group of people to cause drastic changes to be made. Mr McKenzie said that he wished to see how the proxy holders would vote on the issue, since it seemed to him to be important.

Mr G Stancy, G3MCK, asked the President whether any of the proxies delegated to himself had given directions on how to vote in specific areas. The President replied that it was up to individuals to vote as they saw fit and asked the Secretary to clarify the position. The Secretary did so.

Mr P Crosland, G6JNS, asked whether, in view of the obvious mood of the meeting, Mrs Heathershaw and Mr McClintock - as holders of large numbers of proxy votes - would abstain. He said that for them to be used in favour of the motion would clearly be against the wishes of the members present at the meeting, who had heard the arguments on both sides.

The President said that individuals would vote on the basis of how they felt at the time. He called upon the Secretary to announce the result of the show of hands which took place just prior to Mr McKenzie's request for a poll vote. The Secretary stated that a two-thirds majority for the motion had not been achieved; there had been 31 votes for the motion, 120 votes against and 11 abstentions. He added that a poll had been requested and that he would call out the names of proxy holders and record the results. He did so.

The President declared the final result as: for - 127; against - 171; abstentions - 1,111; and declared the motion defeated.

The President then invited the meeting to consider Resolution No.4, of which the text was as follows:

'That the Articles of Association of the Company be altered by deleting from the second sentence of paragraph 64 the words;

'shall be seven'

and substituting the following words;

'shall be eleven'

and that consequently the Articles of Association of the Company be altered by deleting from paragraph 73 the words;

'reduced below seven'

and substituting the following words;

'reduced below eleven'"

A speaker from the floor of the meeting said that he would move the motion. The President asked Mr John Greenwell, G3AEZ, to introduce the motion. He then invited comments from the meeting.

Mr R Broadbent, G3AAJ, felt that the proposed resolution was eminently sensible and should be adopted.

An unidentified speaker proposed that the motion be put. The President called for a proposer and seconder. Mr J Blackwood, G3IG, proposed and Mr J Greenwell, G3AEZ, seconded that the resolution be adopted. The President called for a show of hands, and declared that the resolution was carried overwhelmingly.

The President then declared the end of the Extraordinary General Meeting.

Open Meeting

The President announced that the next part of the meeting, the "Open Meeting", would now take place. The first task was the presentation of Council and Committee awards. (For details see write-up in April RadCom)

The President stated that there was one further presentation to be made. This year a corporate member of the Society had been elected by Council as a Vice-President, having rendered outstanding service to the Society. This member was Major K Ellis, G5KW, who had been a stannch member of the RSGB for some 56 years: he had served on Council on two occasions and on several committees, all at no expense to the Society. Major Ellis was currently a corresponding member of the VHF Committee, which was not surprising in view of the pioneering work he had carried out on the 50, 56 and 70 MHz bands. The President said that wherever Major Ellis had travelled he had demonstrated the best aspects of amateur radio to those whom he had met. As an ambassador for the Society and amateur radio in general, his contribution would be difficult to match.

The President then presented Major Ellis with a certificate to commemorate his election as Vice-President of the Radio Society of Great Britain.

In his reply Major Ellis thanked the President and Council for the great honour bestowed upon him.

President's Address

The President said that although he had been a member of Council for a number of years, it had only been during his year of office as President that he had been able to appreciate the vast amount of work undertaken by the Society on behalf of its members. He added that he had been impressed by the enthusiasm and dedication of the Society's many volunteers and of its Headquarters staff, which had made his year of office both stimulating and rewarding. The President said that he wished to take the opportunity of thanking all who had provided him with valuable support; without it, amateur radio as it was generally understood in Great Britain would cease to exist.

The President then commented on various matters which had occupied the Society's time and efforts during the previous year. These included spectrum abuse, EMC-related problems, intruders into amateur frequency allocations, licensing matters, revision of the amateur licence, Headquarters staffing, the transfer of Radio Communication magazine from Chelmsford, representation, the dial-up "DataBox" service and the Morse Test Service. He said that, as far as the future was concerned, it was necessary to consider further modernisation of the Society's operation. In order to achieve this end a review of the Society's Memorandum and Articles of Association - parts of which had become inappropriate to the Society's current operational requirements - would be undertaken. It was anticipated that further changes to the Memorandum and Articles of Association would be submitted for the consideration of the membership at next years' annual meeting. These would be carefully discussed before doing so.

In conclusion, the President stated that some aspects of the Society's liaison between itself and members at local level required improvement and that the Society would have to work more closely with its representatives in the field and its affiliated clubs and groups in order to achieve this end. A major challenge facing amateur radio all over the world was how to make the hobby more attractive to young people in an age when there was little novelty in electronics and communication by radio. The Society would be addressing this challenge in the course of the coming year but, as always, the amount of progress made would in

part depend on the efforts of volunteers at local level. The President hoped that its members would support the Society in this important endeavour.

The President thanked the meeting for its attention, and his speech received applause.

The President then said that the open forum proper would now begin. The format adopted last year had been to take out written questions at random from a box and reply to them and then to reply to questions from the floor of the meeting.

The first question drawn out was from Mr G Smith, G4AJJ, asking what progress if any had been made with obtaining access to the 50 MHz band by class B licensees. The Secretary replied that, as had been made clear in Radio Communication magazine, the Society was very optimistic about the possibility of class B licensees being permitted to use the 50 MHz band. The Society would be submitting a report to the Department of Trade and Industry on amateur operation at 50 MHz and its contents would be largely based on the results of a survey carried out by means of a questionnaire to be distributed with the latest edition of Radio Communication. It would be on the basis of that report that the Department of Trade and Industry would judge whether it could make further extensions to the concessions which it had granted in respect of the 50 MHz band.

Mr D Vickers, G4SEQ, had asked for the position of Mr Keith Townsend to be clarified; in what capacity had he been appointed as a member of Headquarters staff, whether he had been given a company car and if so whether a cellular radiotelephone had been fitted in the car. Mr Vickers had also asked how many members of Council had company cars and, if any, which had cellular radiotelephones fitted in them. There was laughter from the meeting. The Secretary said that as far as he was aware no member of Council possessed a company car or a cellular radiotelephone supplied by the Society. Mr Townsend was a new employee of the Society and had been a member of its staff for just over one month. His title was Senior News and Information Officer and he was a replacement for Mr John Nelson, who had left the Society's employment some two months ago.

The President said that the questioner must have an odd impression of how Council members were rewarded for their service. They were volunteers and none was given a company car.

An unidentified member asked whether any of the Society's employees had a company car. The Secretary replied that he did and that he had driven some 20 000 miles in the course of Society business in the preceding year. The questioner asked whether a cellular radiotelephone was fitted to this vehicle. The Secretary said that he had purchased his own cellular radiotelephone for the vehicle.

Mr R Rutt, GOAMG, has asked why the President's undertaking to answer questions submitted at last years' open meeting but not dealt with at the meeting, either by letter or in Radio Communication magazine had neither been recorded in the Minutes of the meeting nor fulfilled. Mrs J Heathershaw, G4CHH, Immediate Past-President, said that questions had either been replied to or the information had been given in another form. She added that she was not sure what Mr Rutt had meant. Mr Rutt, who was present at the 1985 meeting, said that he was referring specifically to the open forum. He had understood Mrs Heathershaw, in her capacity as President at the time of last years' meeting, to have said that questions which had not been answered in the course of the open meeting because of lack of time would be answered either by means of a private letter or a statement or article in Radio Communication magazine. He was aware of several instances where this had not not taken place. Mr Rutt added that Mrs Heathershaw's undertaking to this effect had not been noted in the Minutes of the meeting. He said that he did not wish to be a troublemaker and that it seemed to him that democracy had returned to the Society in the course of today's meeting. However, it seemed to him that if the Society made promises it must honour them.

Mrs J Heathershaw said that she considered that the Secretary had replied to Mr Rutt's points in the course of last years' meeting. Mr Rutt said that he had received no separate reply. He wished to use the incident to reinforce what had been said earlier about communication.

Mr G Stancy, G3MCK, had asked for the target date by which the Department of Trade and Industry would release a revised amateur radio licence. Dr J Gannaway, G3YGF, chairman of the Society's Licensing Advisory Committee, replied that the President had mentioned this topic in his address. The Society had intended to pursue the matter during 1986, but other subjects - notably those connected with EMC-related problems - had had to be given a higher priority. In consequence, only a small amount of progress had been made.

The President added that he hoped that a revised licence would be available in one year.

Mr K Partridge, G8AUU, said that he would like to see a breakdown of how income from the licence fee was spent so that the amateur community could see whether it was receiving value for money. He added that the RIS was fully self-financing and wondered whether amateur radio was contributing to the public purse or whether the hobby was being subsidised by British taxpayers. Dr J Gannaway, G3YGF, said that the Society would do its best to obtain the information. He believed that the Department of Trade and Industry had produced some relevant statistics about twelve months ago and added that the Licensing Advisory Committee would look into the matter.

Mr M Stokes, G3ZXZ, said that he had made the point at last years' meeting that he did not think the questions being answered were being drawn at random. He wished to see the box containing the written questions on the table and the questions taken out one at a time.

The President said that the box was on the table. In an allusion to an incident at the 1985 annual meeting, he added that he could not say that the next question to be drawn from it had been written by Mr Stokes himself, since this year it had not. There was laughter from the meeting.

Mr R Glaisher, G6LX, said that the licence revision should be tackled as quickly as possible because the UK was lagging behind many other European countries in the matter of the so-called common licence.

Mr L Mansfield, G2SP, said that according to the current amateur radio licence he was breaking the law by transmitting via a repeater unit in the 430 MHz band. He stated that licences issued in the course of the past twelve months stated that the 430 MHz allocation was 435-440 MHz, whereas it was his understanding that the allocation was 430-440 MHz. Mr Mansfield added that he did not know whether this was a misprint or an omen for the future.

The Secretary explained that some months ago the Department of Trade and Industry had issued a batch of licences which contained several misprints in the Schedule to the licence. The matter had immediately been taken up with the Department, which had stated that it would re-issue licences to individuals who had received licences containing the misprints.

Mr S Bryan, G1SCB, had asked how the Society could justify the lack of information regarding the names and addresses of individual radio amateurs in the current edition of the Call Book when those amateurs had requested inclusion of their details. The Secretary said that there were many amateurs who had not indicated positively to the Department of Trade and Industry (or the Radio Amateur Licensing Unit) that their names and addresses could be passed to other organisations. Because of the provisions of the Date Protection Act their details could not be published. The Secretary added that in simple terms the Society could not publish information which it did not have. In discussions with the Department of Trade and Industry the Society had learned that if applicants for amateur radio licences did not positively indicate that their names and addresses could be published, the Department's assumption was that they could not. What was required was for the Department or the Radio Amateur Licensing Unit to redesign the form so that it was clear that the question relating to the publication of an individual licensee's details had to be answered.

Mr S Bryan, who was present at the meeting, said that he knew of several instances in which new licence holders had specifically requested the Department of Trade and Industry to permit their details to be published. However, the information had not been included in the Call Book. The Secretary reiterated that this was a matter between the Radio Amateur Licensing Unit and an individual licensee. In several instances, the Society had referred to the computer data supplied to the Society by the Radio Amateur Licensing Unit for the purpose of production of the Call Book and the record had been blank. Mr Bryan thought it rather coincidental that 79 consecutive licence holders in the current edition of the Call Book had their particulars withheld from publication. The Secretary agreed with Mr Bryan.

Mr J Linfoot, GOCPP, had asked by letter why the proxy forms of the Society did not follow the procedure of most limited companies in permitting the membership to instruct the proxy how to vote. Mr Linfoot, who was present at the meeting, interjected to say that he felt that the matter had been dealt with earlier in the afternoon.

Mr M Stokes, G3ZXZ, had asked how many Regional Representative's meetings had been held during 1986, in which areas in Region 2 could one be expected to take place and when had the last one been held. The Chairman of the Membership and Representation Committee, Mr D Smith, G4OAX, said that Mr Stokes' questions seemed to contain some ambiguity and asked him to define what he had meant by a "Regional Representative's meeting" He wondered whether Mr Stokes was referring to Official Regional Meetings or meetings of Regional Representatives. Mr Stokes explained that according to the Green Book the Society's Regional Representatives, Area Representatives or representatives of affiliated societies were obliged to meet every three years, to invite local members to attend the meeting and express their views and to communicate these views to Council. Mr Stokes said that he had not seen a record of such a meeting having taken place in "Council Proceedings" during the past year. He added that Mr L Ross, G8MWR, who was not present at the meeting, had raised this topic at the last meeting and had stated that one had not been held for eighteen months. A further twelve months had now elapsed, which suggested to Mr Stokes that there were six months before the three-year period expired.

Mr Smith said that Mr Stokes was evidently referring to Official Regional Meetings and that in fact one had taken place in Newcastle in 1986. He explained that in order for an Official Regional Meeting to take place the Regional Representative was required to ask Council whether one could be held in a particular region. An Official Regional Meeting was required to be held at not more than two-year and not less than three-year intervals. If an Official Regional Meeting had not been held, the Regional Representative should be contacted and asked to explain why not. However, Mr Smith said that Official Regional Meetings were often poorly attended and were therefore often not cost-effective.

Mr Smith (who had recently become Chairman of the Membership & Representation Committee) added that his committee had attempted another approach to the problem by holding meetings of the committee in areas to which it had been invited. Three such meetings had taken place in 1986

and had been regarded as snccessful; the Regional Representative had orranged for the zonal member of Council concerned to attend and to talk to Society members in a particulsr region and an audience could be gusronteed. Mr Smith aoid thot meetings were expensive to hold and it was disappointing to have a smoll audience. He advised Mr Stokes that if he wanted an Official Regionsl Meeting to take place in his region, he should contact the Regional Representative and snggest that one take place. If it could be afforded and if a meeting had not taken place within the prescribed timescsle, the committee would do what it could to arrsnge one. Alternatively, if a visit from the appropriate member of Conncil to answer questions was required, that could also be organised.

Mr Stokes said that the appropriate stepa had been taken in his region ond thot the Council member for Region 7 would be attending a meeting of the North Wakefield Radio Clnb on 11 March 1987. He wished to make the point that it might be aensible to move the annual meeting sway from London since attendsnce figures for meetings in the provinces seemed to be higher thsn for those taking place in London. Mr Smith said that this point hsd been discussed and thst it certainly seemed to some members of his committee that there was more interest in meetings which took plsce ontside London. He added thst, speaking as chsirman of the committee, he wished that people could be forced to attend meetings and also to vote in Council elections.

Mr Stokes said that he did not understand why there was a time limit of 7 pm for the end of the annual meeting.

An nnidentified member asked whether there wos a possibility of inclnding in the next qnestionnaire to be sent to members a qnestion concerning where they would like the annnsl meeting to take place. The President soid that this was possible; it could not be carried out in the lotest qnestionnsire since that hsd already been despatched with the current edition of Radio Communication but the suggestion wonld be conaidered for the next one.

Sqn Ldr T Winchcombe, G62H, said that the Royal Air Force Amateur Radio Society hod held its Annusl General Meeting at Tees-side Airport in 1986; he had been surprised to find thst a simils number of members to thst which hsd come tn Annnol General Meetings held at the Society's hesdquorters st RAF Locking in previous years had attended.

An unidentified member said that holding the Society's annual meeting on a Satnrday afternoon was o considerable improvement on the esrlier practice of holding it at 6.30 pm on a Friday evening. One proposal pnt forward had been to hold the meeting at a lsrge mobile rally in the Midlands so that it would naturally take plsce at a weekend and at a venue where there was olready a large number of radio amatenrs. The spesker wondered whether sny consideratien had been given to such a snggestion. The President said that he did not think specific consideration hsd been given to it but that he could see the merits and demerits of the idea; it would be worth considering. He invited further comments on the matter.

Mr D Bernard, C4RLE, of the Royal Naval Amateur Radio Society, said that in the light of the discussions which had already taking plsce in the meeting he was a little sfraid to put his question but he would, nevertheless, "....stick his neck out".He asked whether Council would give consideration to the urgent need for a more representative method of holding Council elections. The Royal Naval Amateur Radio Society, with a view to assisting Council in this consideration, wished to make the following observations. Under the present form of elections for members of Council, the membership was asked to vote for a candidate who in gonernl terms was not known to them or was only known to them at best from sctivities such as contest operntion or the authorship of technicol articles. In the opinion of the Royal Naval Amateur Radio Society, the present form of election did not result in Council possessing the expertisc, which in the contemporary world was vital, to conduct the Society's affairs in a businessllke manner. The Royal Naval Amateur Radio Society wished to suggest that candidates for membership of Council be drawn from those indlviduals sponsored by affiliated societies on a regional basis. This would have the effect of ensuring that the candidate was known locslly, would linise more fully with his or her local members and would therefore have "grass-roots" contact with Council.. Another important point was that he or she would be known to possess expertisc which was apparently mlsaing from Council on occosions. Mr Bernard added that this proposal had been the result of fruitful discussions between the RSGB and the Royal Naval Amateur Radio Society. He wished to assure the meeting that it was put forward in the real spirit of amatcur radio, which he believed was represented by the majority of those present at the meeting. He felt sure that Council would give serious consideration to the question in their constant review of procedures and their desire to show a profeasional image to Society members ond the general public.

Mr J Heys, G3BDQ, said that there was an inherent problem with the suggestion. He said that affiliated societies were not RSGB societies: he himself wos a member of the Hastings club and he doubted whether more than 20% of thot club's members were members of the Society. He quoted the phrase "no taxotion without representotion" and said that in a Society context its equivalent might be "no representation without subscription".

Dr D Evans, G3RPE, said that he certainly agreed with Mr Bernard's suggestion that something had to be done to improve Council, since the tasks which it faced were becoming much more complicated. He said that the problem was that Council needed to be a body of experts which was capoble of tackling the large range of problems which faced it, and perhaps only 10% of those problems were related to amateur radio itself. He felt that first-class managers, first-class statisticians and those with special expertise in communication with large institutions were required, and there was no guarantee that selection at local level would provide them. Dr Evans added that in his view representation based entirely on regional representation was not as good as the system used at present by the Society. He felt that the Society's system of an equal number of Council members primarily concerned with local matters and those elected for a variety of other reasons such as technical ability was to be preferred. Dr Evans felt that the refusal of the meeting to ratify the proposals embodied in the resolution debated at the Extraordinary General Meeting earlier on had represented a very bad decision.

Dr Evans agreed that the quality of Council members needed to be improved but added that it was necessary to think carefully about how this was to be achieved since amateur radio of the future would need skilled people to look after its interests. He did not think that Mr Bernard's proposals represented the correct solution but he was completely in agreement with the spirit of them.

Mr F Hall, GM8BZX, said that he would challenge the argument that zonal members of Council were not well known. He himself was well known in Scotland and he would assume that other zonal members were also well known in their respective areas. However, he agreed with the sentiments which had been expressed insofar as ordinary members of Council were concerned.

Mr D Smith, G4DAX, Chairman of the Membership and Representation Committee, said that the problem of elected representation presented some very difficult issues and wished to make two points. One was that the candidate who became elected was frequently, as he put it, "....the guy who shouts loudest" and there was no guarantee that members would necessarily know who they were voting for. Some improvements to the candidates' statements published in Radio Communication had been sought for this reason, but even so the number of members who had personal knowledge of the candidate for whom they were voting was very small. As had been pointed ont by another speaker, other bodies had adopted a form of peer-group selection at a lower level.

Mr Smith added that another difficulty which occurred was related to what he called "vote splitting". If there were too many candidates it was very often the case that two good ones were not elected because the votes given to each of them were fewer than those which might be given to one less satisfactory candidate. However, he could not think of a way in which this could be avoided. Mr Smith added that he felt that at a lower level of the Society's hierarchy, such as area representative or regional representative, a required qualification for the prospective postholder should have been the prior holding of an amateur radio-related office such as chairman or treasurer of a club so that the electorate had some idea of the individual's abilities.

Dr I White, G3SEK, said that he agreed with Mr Smith's remarks but added that he did not agree with the solution proposed earlier by Dr D Evans, G3RPE. He said that it was clearly important to have a competent Council, but the way to achieve it was by improving the existing system. Dr White said that a clear signal had been given during the course of the meeting that it was the ordinary members of the Society who wished to be able to choose those who should serve on its Council. If Council itself was not satisfied with the calibre of those who were elected, it was for Council to educate members of the Society so that they would be in a position to cast informed votes.

The President said that the meeting would now consider another written question. Sqn Ldr T Winchcombe, G6ZN, had asked whether proxy holders were allowed to speak at the Annual General Meeting on behalf of the members whose proxy votes they held. Article 48 of the Society's Memorandum and Articles of Association referred only to voting. The Secretary replied that the answer was contained in Article 49, which stated that;

> "The instrument appointing proxy shall be deemed to confer authority to demand or join in demanding a poll".

The Secretary said that this seemed to imply that a proxy holder had no right at all to speak at a meeting. He added that Article 22 was also apparently relevant; this stated that;

> "No member whose subscription is in arrears shall be entitled to receive notice or to attend or take part in meetings or other activities of the Society".

The Secretary said that no-one present at the meeting received a pink card, which was required to be shown during voting, unless they were a fully paid-up member of the Society.

An unidentified speaker asked whether Mr I Abel, G3ZHI, possessed a pink card. The Secretary replied that he did not. The speaker observed that Mr Abel had had a good deal to say on behalf of his proxy. The Secretary said that Mr Abel probably had no right to say anything at all; however, the Chairman was attempting to do his best to accommodate everyone.

Another unidentified speaker, referring to the fact that Mr Abel had apparently been tape-recording the proceedings of the meeting, said that next year he would be asking whether there was a right to do so; he himself was not sure that he wished his comments to be recorded, although he added that he would have no objection if the meeting authorised it. He enquired whether the President had authorised such a recording to be made. The Secretary stated that it was a meeting of members open to the public.

Mr M Stokes, G3ZXZ, read out part of Section 372 of the Companies Act 1985. Mr Stokes was asked to read out the following sub-section, which he did; the provisions of this sub- section showed that the text first

read out by Mr Stokes did not, in fact, apply to a company such as the Society which did not have a share capital.

Sqn Ldr T Winchcombe, G6ZH, said that he would like to take up a further point concerning proxy holders taking direction from those whose proxies they held. He felt that direction could be permitted. The President commented that this was one reason why the Memorandum and Articles of Association of the Society were being reviewed, as he had previously mentioned in the course of his address.

The next question was from Mr P Tucker, G4DWZ, who had asked whether Council would consider the incremental benefit of a small change in subscription compared to services. The Secretary said that earlier in the meeting he had quoted the example of legal costs insurance, the premium for which would amount to about £1 per member. However, Council would have to balance the increase against the likelihood of its ever being required. The Secretary added that when subscriptions were increased there would be a consequential and unavoidable decrease in the number of members, as had already been said in the course of the meeting by another speaker.

The Secretary said that Council was at all times aware that the Society's task was to be a representative body for radio amateurs in Great Britain, and that it had to bear in mind the amount of money which members had available. There were many ways in which to use another £1 per member to great benefit; the difficulties were to decide what, how and when. Mr Chadwick, G3RZP, noted his interest in beer and said that when he joined the Society, the then subscription would buy 50 pints of beer; that was not the case today. He said that today the RSGB had more services and more HQ staff for less money.

An unidentified member asked whether it would be possible for subscriptions to be paid by direct debit half-yearly or quarterly. He felt that this would spread the cost and ease the situation for those who found one annual payment difficult. The Secretary replied that there were actually two issues implicit in the question. One concerned direct debit, which had been under discussion within the Society for some time. He hoped that the facility could be introduced relatively quickly but the introduction of direct debit facilities was quite complex and would take some time to undertake. As far as partial payments were concerned, the Secretary made the point that a certain amount of staff time was involved whenever a payment came into Headquarters. If four separate payments were to be associated with one member, the required staff time would be multiplied by four. He questioned the cost-effectiveness of the proposal.

Another unidentified speaker said that a higher subscription might be feasible under such a system since individuals would not need to pay an annual lump sum. He suggested that a costing exercise might be beneficial.

Mr R Broadbent, G3AAJ, said that an organisation with which he was involved included on its form for application for membership a question as to whether the prospective member wished to give a donation to the organisation. He added that the organisation had been able to keep its subscriptions to a minimum for the past seven years since more than 70% of its members had made a contribution in this way. Mr Broadbent said that in previous years the Society's membership application form had contained similar wording, and he felt that members had in many cases been prepared to made small additional contributions in view of the services given to members by the Society.

An unidentified member requested that the results of Council's consideration of what could be done with the proceeds of a small increase in subscription rates would be published in Radio Communication so that they could be considered by the membership. Another unidentified member asked whether it might be possible for the Society to accommodate subscription payments for several years in advance without too many administrative difficulties arising. The Secretary said that life membership of the Society was the best way of achieving the same end and added that it was very good value for money.

Mr J Wright, RS 18582, said that spare cash invested in the Post Office at a rate of £3 per month would provide enough in the course of a one-year period to cover the cost of subscription. He also asked whether anyone who was exempt from paying a subscription but who then received money, possibly via a family trust, was obliged to notify the Society. The President said that he did not know the answer.

The next question had been asked by Mr C Ruff, who wondered when it was proposed to update the Awards Manual since it was woefully out of date. Mr P Chadwick, G3RZP, chairman of the Technical and Publications Committee, said that the Awards Manual was currently in the process of being updated.

The President said that the next question was from Mr P Crosland, G6JNS, who had advised the Society that he wished to ask a question concerning the Annual Report. Mr Crosland, who was present at the meeting, said that he had read the Annual Report with interest but had been dismayed to note that there had been no report from the Membership and Representation Committee and also no report from the Microwave Manager. He considered that these were very serious omissions and requested an explanation of why they had not been included. Mr D Smith, G4DAX, chairman of the Membership and Representation Committee, said that the year reviewed in the 1986 Annual Report was the period between 1 July 1985 and 30 June 1986. The deadline for contributions from Society officials for receipt of their copy relating to the 1986 Annual Report had been 1 July 1986. Mr Smith said that he could not speak for his predecessor in the matter of why he had seen fit not to make a report. He read to the meeting a copy of a reminder memorandum sent to the then chairman, Mr K Willis, G8VR, on 5 June 1986. Mr Smith added that since Mr Willis had been one of Mr Crosland's nominees when Mr Crosland had stood as a candidate in the recent Council elections, it was obvious that the two individuals were fairly friendly. Mr Smith suggested that Mr Crosland should ask Mr Willis directly why he had not managed to submit his report. He added that Mr Willis had many commitments and had been very busy at the time; it was possible that there had been an oversight.

Mr Smith also outlined some organisational problems which the Membership & Representation Committee had experienced in previous years

Mr Smith concluded his remarks by saying that in the period under review there had been four meetings of the committee. Although not able to complete the standard proforma of attendance, Mr Willis had indicated who had been present at meetings and who had not. Mr Crosland was asked to have this information if he was interested. Mr Smith regretted that he was not able to take the matter further.

Dr D Evans, the Society's Microwave Manager, said that he was entirely responsible for the omission of his report from the Annual Report and explained the reasons for it.

Mr A. Cockle, G3IEE, had asked whether the Society had considered the production of special Christmas cards for sale to members, which he considered would be popular and profitable. The Secretary replied that the Society had been considering this possibility for some time and that he believed that Society Christmas cards might be available in the future.

Mr I Jackson, G3OHX, wished to ask whether the Society was aware of the unsavoury image of amateur radio portrayed to outsiders and also, since much of the abuse to which he was referring took place via 144 MHz repeater stations, whether the Society was prepared to continue to sponsor their use. In reply Mr R Osborne, G4FJN, of the Amateur Radio Observation Service, stated that the Society was very much aware of spectrum abuse in all its forms. A good deal of work took place with a view to tracing sources. However, the Amateur Radio Observation Service was advisory rather than disciplinary. Mr Osborne stated that this did not mean that he would not channel information concerning a serious offence to the appropriate authority in order for it to be dealt with, but that was not what he wished to do. He added that he could take no action unless all necessary information in respect of a particular incident was brought to his attention. If an offance appeared to have been committed he would write a letter of admonishment and advice. If the matter concerned a technicality, he would write a letter of advice. Mr Osborne said that there were two important aspects of spectrum abuse for the Amateur Radio Observation Service to consider. One was a breach of the terms and conditions of the amateur radio licence, which was in fact an offence against the law; the other was simply bad operation. Both required a great deal of attention, and he wished to make the point that a good deal of local assistance was required and his resources, manpower and equipment were very limited. The Amateur Radio Observation Service relied on a number of volunteers around the country; there were relatively few of them since their job was not particularly popular and not many radio amateurs had the time for monitoring and reporting incidents to Mr Osborne or to the Society.

Mr T Hughes, G4WKJ, felt that Radio Communication could be used to inform members of the situation and to solicit their assistance. It was important to set out what should be reported and to whom it should be reported. There was nothing to be gained by saying that there was a lot to be done and no knowledge of how to achieve it; the expertise within the Society should be used by the Amateur Radio Observation Service in the face of difficulty in obtaining assistance from individuals not under his control. He considered that Mr Hughes would not have made his comment if he had fully appreciated the situation. Mr Osborne agreed that there was some scope for utilising Radio Communication magazine in connection with the work of the Amateur Radio Observation Service. He added that he had been in touch with certain groups who were experiencing serious problems and requested their assistance but their response had been generally poor.

The President said that the next question would be the last, since it was necessary to begin leaving the building shortly. Ms A Voss, GOCCI, had said that according to recent reports in the national press, Parliament was considering proposals for privatisation of the radio spectrum. She had asked how the Society considered that this would affect the amateur radio service and whether the Society was planning any moves to oppose any adverse effects of this suggestion. The Secretary said that an organisation known as CSP International had been asked by the Government to carry out a review of the possibilities in this area. To his knowledge the report had not yet been published although, as Ms Voss had said, there had been comments in the press. It seemed to the Secretary that there was little likelihood of any difficult implications for amateur radio since it seemed to be outside the sphere of interest of an organisation tasked with revenue-earning management of the radio spectrum. The Society had made an input to the review. The Secretary added that as far as he was aware some relevant information was being published in the January 1987 edition of Radio Communication. In view of the lack of time left for the meeting, he would content himself with saying that there seemed to be no particular threat to amateur radio posed by the review.

In conclusion, the President said that any members who had not received replies to their questions because of lack of time would receive a reply from the Secretary. He wished members a safe journey home.

There was applause and the meeting ended at 7.00 pm

RSGB
National Convention 1987

National Exhibition Centre

Preview

There is no doubt that the National Exhibition Centre – close to Birmingham Airport and just a few minutes' walk from Birmingham International BR station, is far and away the best place in Britain for the RSGB's National Amateur Radio Convention. The purpose built complex provides the best facilities for any type of exhibition and regularly hosts some of the country's major events. It is the natural choice for a national convention.

Over the past few years the Society has overcome the initial teething troubles of re-siting from London to the Midlands, and now hosts the largest and best attended convention of its kind anywhere in the UK.

Open:
10am -6pm
Friday 27th
& Saturday 28th
March 1987

Special Attractions

- ★ Receiver kit construction. An opportunity to have a go at building a simple receiver with expert help - HCF/GQRP stand.
- ★ CW pile-up competition: A prize for the winner and the leading Class B licence/Short Wave Listener - HFCC stand.
- ★ Checking of QSLs for HF awards (not DXCC) - Friday only.
- ★ Collection box for outgoing QSLs - Please ensure cards are sorted as per recommended method.
- ★ Contest results: 21/28MHz SSB; 21MHz CW; 1st 1.8MHz and (hopefully) Affiliated Societies - HFCC stand.
- ★ Computerised DX Quiz - HFC stand.
- ★ Antenna Quiz - HFC stand.
- ★ Updated Contest Calendar, free handout - HFCC stand.
- ★ Demonstration station.
- ★ Video Text Display - RMG stand.
- ★ Packet Working Group sub-Committee - RMG stand.
- ★ Packet radio demonstration - RAYNET stand.
- ★ Mobile communications caravan - RAYNET stand.
- ★ Demonstration of 2m amplifier linearity testing: Bring your 2m amplifier - VHFC stand.
- ★ US FFC Examinations (Saturday only): Details in Feb 87 *Radio Communication* - page 113, col 3.

Timetable: (Friday)

[illegible] – Doors Open
Restaurant opens for coffee and tea
[illegible] pm – Official opening ceremony
John Butcher, MP, Parliamentary Under Secretary of State for Industry, will perform the opening ceremony. Planned live GB2RS broadcast - On air from 10/15 on 3650 kHz SSB, 7047.5 kHz, SSB and 145.550 MHz FM)
[illegible] opens
[illegible] re programme begins
[illegible] Restaurant opens for lunch
[illegible] pm – Restaurant closes
[illegible] pm – Bar closes
[illegible] pm – Convention Closes

Timetable: (Saturday)

[illegible]

Exhibitors: Alphabetically

Stand No.	*Exhibitor*
E10	Allweld
A2	AMSAT UK
C8/D9	ARE Communications Ltd
B14/C15	Arrow Electronics
	Astley Video Services
A2	BARTG
A2	BATC
A2	BYLARA
T9-10	Bernard Babani
T48-52	Bonex Ltd
T30	Brial Services
	Cirkit Holdings Plc
T38-40	Computer Junk Shop
B4	DARC - German National Society
C7	Datong
L9-14	D. S. Electronics
K12-14	East Cornwall Communications
A2	G-QRP Club
J8-13	Garex Electr[illegible]
B2/C3/C5	German Compan[illegible]
G1-8	Gemini Electr[illegible]
P4-6	Heatherlite
H2-3	Hilton Plant[illegible]
C2	Jaybeam Ltd
T20-22	JEP Electronics
K9	R. A. Kent
N11-13	Linway Electronics
N8-10	Loutronics
G[illegible]	M&B Radio Leeds
T53-58	Marco
E5	MCR Services
S13-14	Minffordd's
T7-8	Minicost
	H. J. Morgan-Smith
T1	Newton Engraving Co.
	Practical Wireless
M12	QuartzSlab Marketing Ltd.
A2	RAIBC/QTI/RSGB disabled members' counter
A2	RAPARS
	RAYNET
	Remote Imaging Group
G9-14	Rich Electronics
A2	RNARS
A2	RSARS
A2	RSGB Committees & Bookstall
E17	Sandpiper Communications
	SGS Electronics
K4-6	Sitek
B10/B12	SMC
H4-6	Spectrum Communication
T42-44	Stephens Electrical
T45-47	Syon Trading
R9-14	Telford Electronic Distri[illegible]
A14/A16/A18/A20	Thanet Electronics
	S. J. Tonks
T34-37	W. H. Westlake
H10-13	Wilson Valve
T25-29	T. W. Wra[illegible]

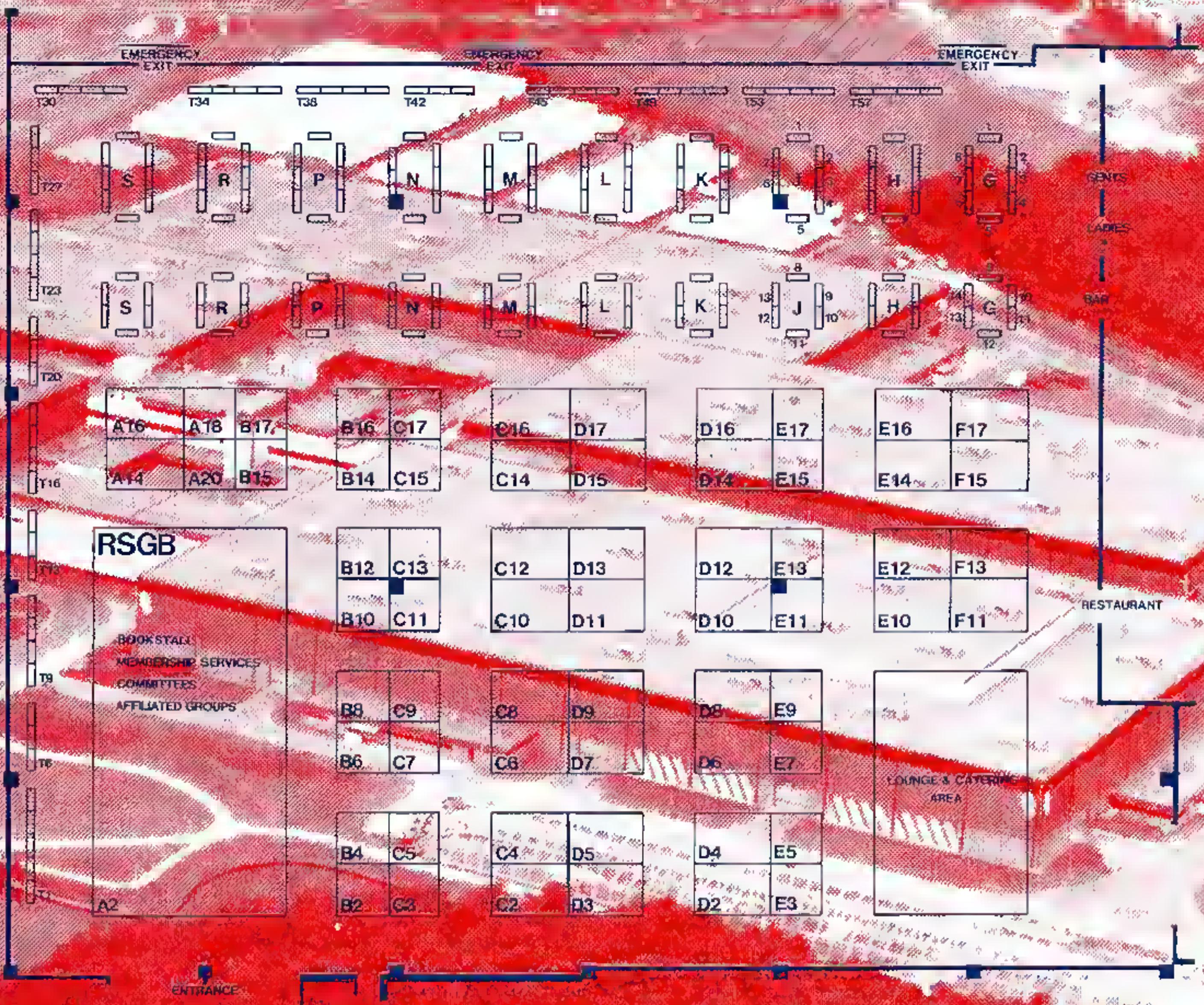
and many more

Annual General Meetings: (Satur[illegible]

- ★ RAOTA - Radio Amateurs' Old [illegible]
- ★ RAIBC - Radio [illegible] & B[illegible]d Clu
- ★ QTI - Talking N[illegible] or the Blin
- ★ 6 metre Group

Other Meetings: (Sa[illegible]

- ★ Repeater Managem[illegible]t G[illegible]
- ★ RAYNET C[illegible]



Lecture Programme

Lectures take place in the 'hospitality suites' which are located on level 3, off the Piazza area. Leave the exhibition hall and turn left heading towards the main entrance of the NEC complex. The lifts and stairs to level 3 are to be found about halfway down on the left.

Time	*Stream A*	*Stream B*	*Stream C (Saturday only)*
1030	"Guide to successful contesting" – HF Contest Committee	"HF antennas for the small garden" – Don Field, G3X[illegible]	"RAYNET – an introduction" – Geoff Griffiths, G3STG
1200	"Getting the best out of VHF" – Angus McKenzie, G3OSS	"Preparing for the Morse test" – [illegible]	
1330	"Operation Raleigh" – John Layton, G4AAL	"HF linears" – Peter Chadwick, G3RZP	
1500	"IOTA Forum" – chaired by Roger Balister, G3KMA	a) "QRP in the workshop" – Rev. G. Dobbs, G3RJV b) "QRP in the shack" – C. Page, G4BUE and P. Linsley, G3PDL	"VHF contest forum" – VHF Contests Committee
1630	"Meteor scatter operating procedures" – Dave Butler, G4ASR	"Propagation – Chapter 1" – Ray Flavell, G3LTP	"Practical packet" – Ian Wade, G3NRW

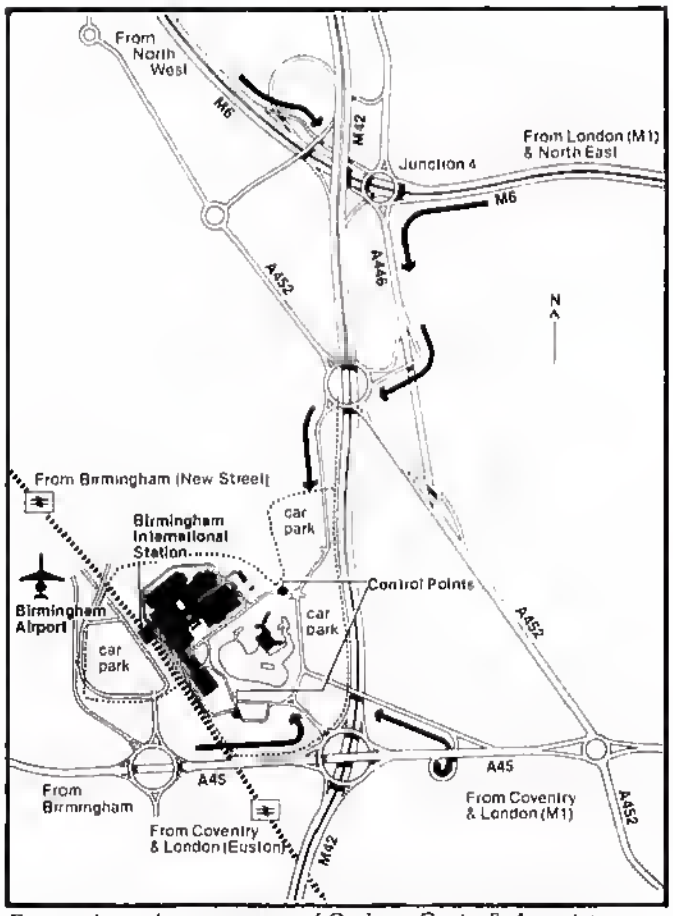
Facilities

The NEC has a covered pedestrian area (The Piazza) which is enclosed by the main exhibition halls. All visitors, whether arriving by air, road or rail, walk through this area which houses Banks (with cash-point machines), a Post Office, telephones, a medical centre, travel centre, information bureau and shop. Inside the exhibition hall itself you will find a well stocked bar, bistro-style self-service restaurant and two mobile catering kiosks with adjacent tables and chairs. Throughout the exhibition complex there are facilities for the disabled including ramps and wide-access toilets. As at last year's event, the Society will be providing a special low-level counter and area on its stand for its disabled members and visitors.

Accommodation

Being in the heart of England, the NEC is surrounded by ample accommodation to suit all pockets. It's just a short trip from the busy, bustling, bright lights of Birmingham or the quaint, quite relaxed atmosphere of Stratford upon Avon. Why not take the whole family for the weekend, giving you time to have a leisurely look around the exhibition whilst the rest of the family has a look around the town. In the evening you can relax over dinner and plan a Sunday trip around this beautiful 'Heart of England'.

Information about the whole range of local accommodation, amenities and attractions is available from The Heart of England Tourist Board on 0905-29511, or the NEC's hotel booking service on 021-780 4141 or from your local tourist information office. It's also worth getting hold of the Tourist Board's *Let's Go* guide (available free of charge from most local offices) which gives details of hotels, inns and guest houses offering off-peak and weekend packages at very reasonable prices.



Front colour photo courtesy of Graham Gavin & Associates

Travelling to the Convention

By road:
Birmingham is located at the centre of the national motorway system and can be reached quickly and easily from all parts of the UK. A network of specially built roads (see map) gives direct access from the M1, M5, M6, M42 and M45 with free parking at the NEC for 15,000 cars and 200 coaches. A free 'Shuttle' bus brings visitors from the car park to the main entrance. The NEC is also on local bus routes. Please note that if you do come by car you should lock your mobile rig in the boot, out of sight. Talk-in will be provided by the Solihull and Chelmsly Wood Raynet group on 2m and 70cm, the callsign will be GB8NEC.

By rail:
Birmingham International BR station was built specifically to serve the NEC and is linked by covered walkway and escalator to the Piazza and exhibition buildings. Frequent high-speed Inter-City trains from London (Euston) provide an eighty-minute connection and there are regular ten-minute connections to Coventry and Birmingham (New Street) stations The latter is an important hub in the UK rail network. The list below gives details of trains from various parts of the country which will get you to the convention for the opening or soon afterwards. Trains from Scotland are available but you will have to change at one or more stations on route.

Birmingham New Street to Birmingham International (NEC)

Depart: 10 18 21 37 48 51 mins past the hour
Arrive: 22 27 27 47 57 07 mins past the hour

London (Euston) to Birmingham International (NEC)–Friday

Depart:	London	08.05	08.35	09.05
	Milton Keynes			09.44
	Rugby	09.09		10.09
	Coventry	09.21	09.46	10.24
Arrive:	Birmingham Int.	09.32	09.57	10.35

London (Euston) to Birmingham Int. (NEC) – Saturday

Depart:	London	07.30	08.35
	Milton Keynes	08.09	
	Coventry	08.44	09.46
Arrive:	Birmingham Int.	08.55	09.57

South West to Birmingham New Street – Friday & Saturday

Depart:	Penzance			05.07	
	Plymouth			07.00	
	Exeter St Davids	06.25		08.00	
	Tiverton			08.16	
	Taunton			08.30	
	Western S-Mare	07.17			08.05
	Bristol Temple Meads	07.40		09.13	09.00
	Cardiff		07.35		
	Newport		07.50		
	Bristol Parkway	07.50	08.15	09.23	09.12
	Gloucester	08.25			09.55
	Cheltenham	08.34	08.54	09.57	10.05
Arrive:	Birmingham New Street	09.25	09.56	10.41	10.58

North West to Birmingham New Street – Friday & Saturday

Depart:	Manchester Piccadilly	07.25	07.42
	Stalford	08.26	09.10
	Wolverhampton	08.46	
Arrive:	Birmingham New Street	09.12	10.01

IMPORTANT – Please check these times with British Rail before commencing your journey.

By air
Birmingham Airport is adjacent to the NEC and is connected by a mono-rail service to Birmingham International station. Scheduled flights operate between Birmingham and major European cities with six flights a day on weekdays and four on Saturdays connecting with London Heathrow. The airport can also accommodate special exhibition charter flights, helicopters and private aircraft for those who wish to arrive in style!

. . . . . see you there

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Announcing the HF/VHF/UHF base station you'll hear about on the air.

Listen for Yaesu's FT-767GX everywhere you might hear it: HF, 6 meters, 2 meters and 70 cms.

You'll hear operators calling it the ideal HF/VHF/UHF base station.

And they'll rave about its full-featured performance and highly attractive price.

You see, the FT-767GX continues the price/performance tradition of our popular FT-757GX. But with even more features.

When you're ready to expand beyond HF coverage, just plug in optional modules for 6-metre, 2-metre, and 70-cms operation.

As standard equipment, you get a built-in HF automatic antenna tuner, AC power supply, digital SWR meter, digital power output meter, electronic keyer, and CW filter.

And operation is smooth and intuitive with keyboard frequency entry. Dual VFOs that tune in 10-Hz steps. A digital display in 10-Hz steps. And ten memories that store mode, frequency, and CTCSS tone information.

The FT-767GX is ready to operate full duty cycle at full rated power output for up to 30 minutes. And it listens from 100 kHz to 30 MHz.

Plus your station is really complete with full CW break-in, our patented Audio Peak Filter for CW operation, a CW TX offset variable 500/600/700 Hz, IF shift, an IF notch filter, a Woodpecker noise blanker, a VFO tracking system for slaved A/B VFO tuning. And that's just a partial list!

But the best way to discover its full-featured performance is to visit your Yaesu dealer today.

Yaesu's FT-767GX. The affordable way to be heard on HF, VHF and UHF.

For further information turn to the inside front cover and page 168

YAESU

Our 30th Anniversary.

South Midlands Communications
S.M. House, School Close,
Chandlers Ford Industrial Estate,
Eastleigh, Hants SO5 3BY
Tel: (0703) 255111
Amateur Electronics
504 Alum Rock Road,
Birmingham B8 3HX
Tel: 021-327 1497